DEPARTMENT OF THE ARMY TECHNICAL MANUAL

DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

TM 11-809-10
TO 31R2-2URT-121

RADIO TRANSMITTERS

T-368/URT, T-368A/URT
T-368B/URT, AND T-368C/URT
AND ANTENNA TUNING UNIT
BC-939-B
OPERATOR'S MANUAL

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

MAY 1958

WARNING

DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

Be careful when working on the 2,400-volt dc high-voltage circuits, or on the 115-volt ac line connections.

DON'T TAKE CHANCES

DANGEROUS RF VOLTAGES ARE EXPOSED

ON ANTENNA TUNING UNIT BC-939-B

2,400 VOLTS DC EXIST IN THE

FOLLOWING UNITS OF THE RADIO TRANSMITTER:

RF DECK

MOD DECK

HV POWER SUPPLY DECK

TECHNICAL MANUAL
No. 11-809-10
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DEPARTMENTS OF THE ARMY
AND THE AIR FORCE

WASHINGTON 25, D. C., *14 May 1958*

RADIO TRANSMITTERS T-368/URT, T-368A/URT, T-368B/URT, AND T-368C/URT, AND ANTENNA TUNING UNIT BC-939-B

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*** This manual supersedes so much of TM 11-809/TO 31R2-2URT-101, 22 April 1955, including C 1, 11 December 1956; C 2, 24 January 1957; C 3, 4 April 1957; and C 4, 8 May 1957, as pertains to operations.**

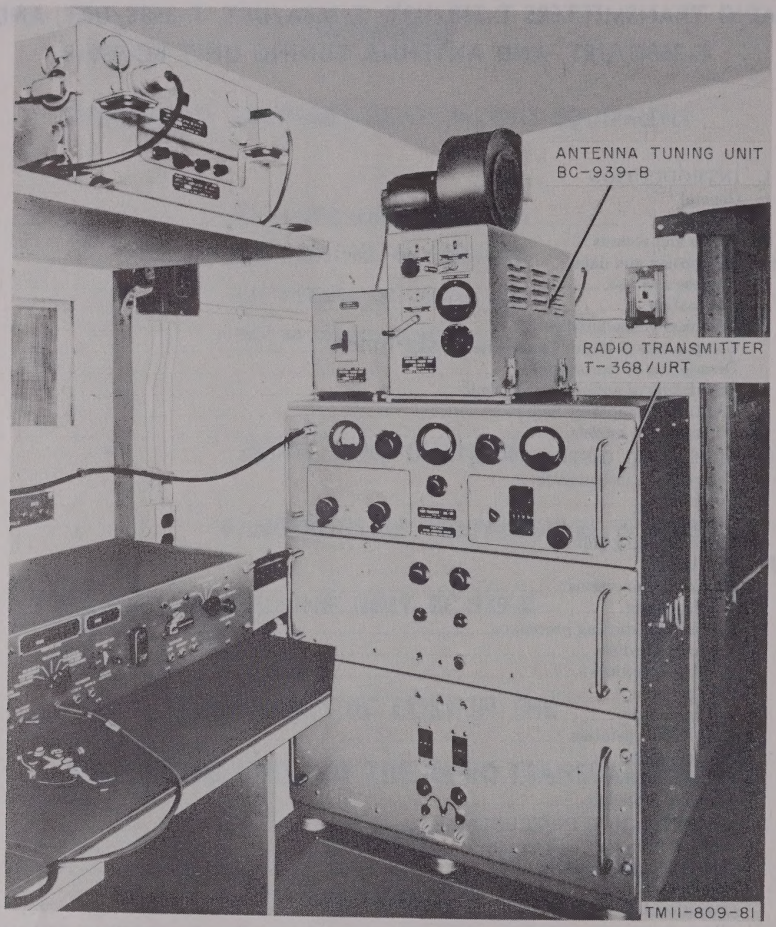


Figure 1. Radio Transmitter T-368/URT and Antenna Tuning Unit BC-939-B.

CHAPTER I

INTRODUCTION

Section I. GENERAL

1. Scope

a. General. This manual covers operation and operator's maintenance of Radio Transmitter T–368(*)/URT and Antenna Tuning BC–939–B (fig. 1). Throughout this manual, Radio Transmitter T–368(*)/URT is called the transmitter, and Antenna Tuning Unit BC–939–B is called the tuning unit. Appendix I is a list of references applicable to this equipment.

b. Maintenance Allocations Charts. Maintenance Allocations Charts for the transmitter and the tuning unit will be included in TM 11–809–20.

c. Repair Parts and Special Tool Lists. Refer to DA Supply Manual SIG 7 & 8 AN/GLQ–2 for maintenance parts information for the transmitter; and to SIG 7 & 8 BC–939 for maintenance parts information for the antenna tuning unit.

d. Models. Official nomenclature followed by (*) is used to indicate all models of the transmitter covered in this manual. Thus, Radio Transmitter T–368 (*)/URT represents Radio Transmitters T–368/URT, T–368A/URT, T–368B/URT, and T–368C/URT.

e. Comments. Forward comments on this publication direct to Commanding Officer, United States Army Signal Publications Agency, Fort Monmouth, New Jersey.

2. Forms and Records

a. Unsatisfactory Equipment Reports.

(1) Fill out and forward DA Form 468 (Unsatisfactory Equipment Report) to Commanding Officer, United States Army Signal Equipment Support Agency, Fort Monmouth, New Jersey, as prescribed in AR 700–38.

(2) Fill out and forward AFTO Form 29, Unsatisfactory Report, to Commander, Air Materiel Command, Wright-Patterson Air Force Base, Ohio, as prescribed in AF TO 00–35D–54.

b. Damaged or Improper Shipment. Fill out and forward DD Form 6, Report of Damaged or Improper Shipment, as prescribed in AR 700–58 (Army) and AFR 71–4 (Air Force).

c. Preventive Maintenance Form. Prepare DA Form 11–238, Maintenance Check List for Signal Equipment (Sound Equipment, Radio, Direction Finding Radar, Carrier, Radiosonde and Television) (figs. 19 and 20) in accordance with instructions on the form.

Section II. DESCRIPTION AND DATA

3. Purpose and Use

a. The transmitter is a medium power radio communications transmitter which transmits continuous wave (cw) and amplitude modulated (AM) signals over a distance of more than 100 miles. The frequency range of the transmitter is from 1.5 to 20 megacycles (mc). The transmitter radio-frequency (rf) output power is 400 to 450 watts with input power of 1,570 to 2,200 watts from a 115-volt, 50- to 60-cycle alternating-current (ac) source.

b. The transmitter is also used as a power amplifier for low-powered exciter units or as a driver for high-powered transmitters. When used as an amplifier, the transmitter is capable of transmitting frequency-shift keying (FSK) signals and other types of signals, such as narrow-band frequency-modulated signals. FSK and am operations can also be combined for simultaneous transmission on one carrier frequency.

c. Antenna Tuning Unit BC–939–B must be used with the transmitter when a long-wire or whip antenna is used. The tuning unit covers a frequency range of 2 to 20 mc.

4. Application (fig. 2)

The transmitter is limited to cw and AM operation when used as a single unit. For other types of modulation the transmitter amplifies modulated rf signals from an external exciter. The system application of Radio Transmitter T–368(*)/URT is described in *a* through *g* below.

a. For cw operation, a handkey is used to interrupt the rf carrier. A headset or a loudspeaker can be used to listen to a side-tone signal keyed simultaneously with the rf carrier. This enables monitoring the operator's keying.

b. In AM operation, a carbon microphone is used to modulate the transmitter carrier in accordance with voice variations. The carrier may also be modulated by using a telephone set over a 600-ohm line.

c. For FSK and FSK-AM operations, a frequency-shift exciter feeds keyed signals into the transmitter, the signals are then amplified and transmitted. A teletypewriter is the keying source.

d. For EXT EXC operation, narrow-band frequency-modulated signals (or equivalent) are fed into the transmitter and are then amplified and transmitted.

e. When any transmitter except the T–368/URT (basic model) is used in Radio Set AN/GRC–26D, the FSK and EXT EXC receptacles are connected to an FSK modulator. Internal connections of the transmitter are recabled and the transmitter then functions as a signal source for the FSK modulator. The FSK modulator, in turn, keys the transmitter in accordance with teletypewriter signals for FSK operation.

f. For remote control operation, a receptacle on the rear of the transmitter permits cabling to a remote control box. A relay in the control box will disable a receiver when the transmitter is in operation.

g. The transmitter may be used in fixed station or mobile operation. A doublet or long-wire antenna is used for fixed station operation, and a whip antenna is used for mobile operation. Antenna Tuning Unit BC–939–B matches the impedance of a long-wire or whip-type antenna to the transmitter.

5. Technical Characteristics

Frequency range	1.5 to 20.0 mc.
Distance range	Over 100 miles.
Transmitter type	Master oscillator, frequency multiplier, intermediate power amplifier, and power amplifier.
Types of signals transmitted	Cw and AM.
Type of modulation	Amplitude.
Input signal levels:	
FSK	3 to 5 volts.
External excitation	30 volts (max).
Input impedance:	
FSK	56 ohms.
External excitation	1,000 ohms.
Number of tubes	25 in basic model, 29 in all other models.
Antennas:	
Fixed station operation	Doublet of proper length to match operating frequency. Long-wire with antenna tuning unit.
Mobile operation	Whip-type with antenna tuning unit.
Power output:	
Cw	450 watts (approx).
AM	400 watts (approx).
Power input	115 volts, 50-60 cps, 1 phase; 1,570 watts (cw) or 2,200 watts (AM); power factor .91 (cw) or .994 (AM).
Weight	650 pounds.

6. Components of Radio Transmitter T–368(*)/URT

a. Components. The transmitter components (fig. 3) are listed in the following chart:

Component	Required No.	Overall Height (in.)	Overall Depth (in.)	Overall Width (in.)	Volume (cu. ft.)	Unit weight (lb.)
Transmitter	1	41½	31	32	24	650
Cord CD–763	1	13 ft (lg)				5
Jumper plug (installed)	1	2½ (lg)	1½ (dia)			
Manuals	2	10¼		7⅞		
Running spares (*b* below)	1 set					
Total weight (lb)						655

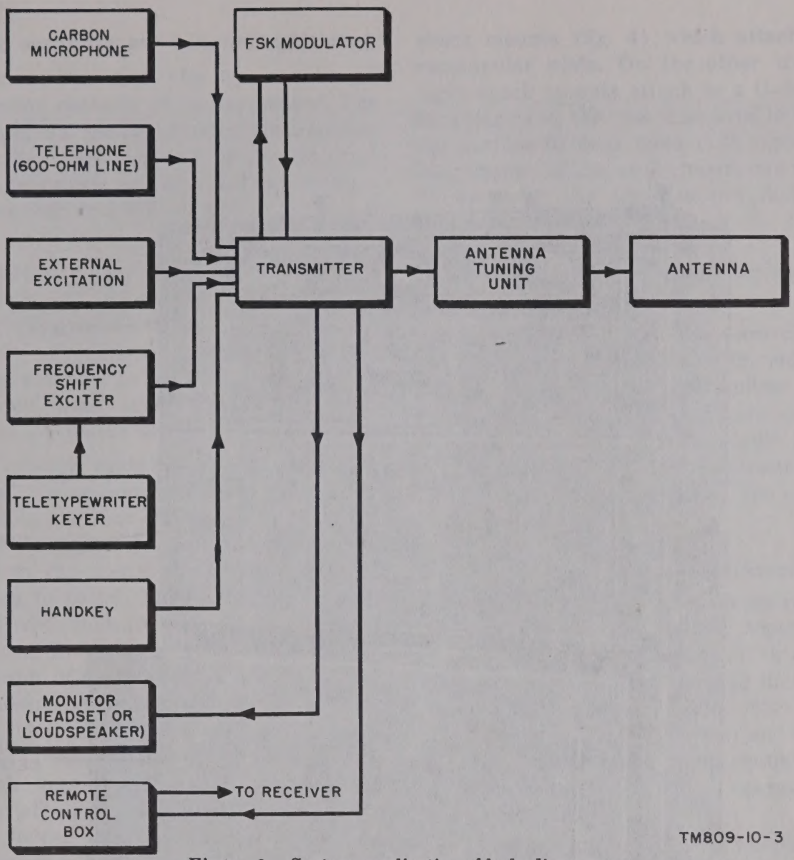


Figure 2. System application, block diagram.

b. Running Spares.

Basic model	Lettered models
2 tubes, OA2	2 tubes, OA2
1 tube, 3B28	1 tube, 3B28
1 tube, 4D21	1 tube, 4D21
1 tube, 4–400A	1 tube, 4–400A
1 tube, 5R4WGY	2 tubes, 5R4WGA
1 tube, 6C4W	1 tube, 6C4W
1 tube, 6AH6	1 tube, 6AH6
1 tube, 6000	1 tube, 6000
1 tube, 5749/6BA6W	1 tube, 5749/6BA6W
1 tube, 12AT7	1 tube, 12AT7WA
1 tube, 5726/6AL5W	1 tube, 5726/6AL5W
1 tube, 5814	1 tube, 5814WA
1 tube, 5933/807W	1 tube, 5933
1 incandescent lamp, 6 watts, 110 to 120 volts	1 incandescent lamp, 6 watts, 110 to 120 volts
6 cartridge fuses, 3 amperes, 250 volts	3 cartridge fuses, 3 amperes, 250 volts
6 cartridge fuses, 6 amperes, 250 volts	3 cartridge fuses, 6 amperes, 250 volts

7. Description of Transmitter (figs. 3, 4, and 5)

a. The equipment consists of three separate decks contained in a cabinet rack. The decks, from top to bottom, are the rf, the modulator, and the power supply. Captive bolts and handles on each deck permit unfastening and removal of the decks from the housing for servicing and adjustment purposes.

b. The rf deck (fig. 3) contains all the rf controls and the meters of the equipment on its front panel. Each tuning control contains its own mechanical counter. Two coaxial receptacles, FSK and EXT EXC (fig. 6), provide a means of bringing in outside signals for increasing the types of service selected by the SELECTOR SERVICE switch. The exciter stages are mounted on subassemblies and can

K7 B2262 Delay relay

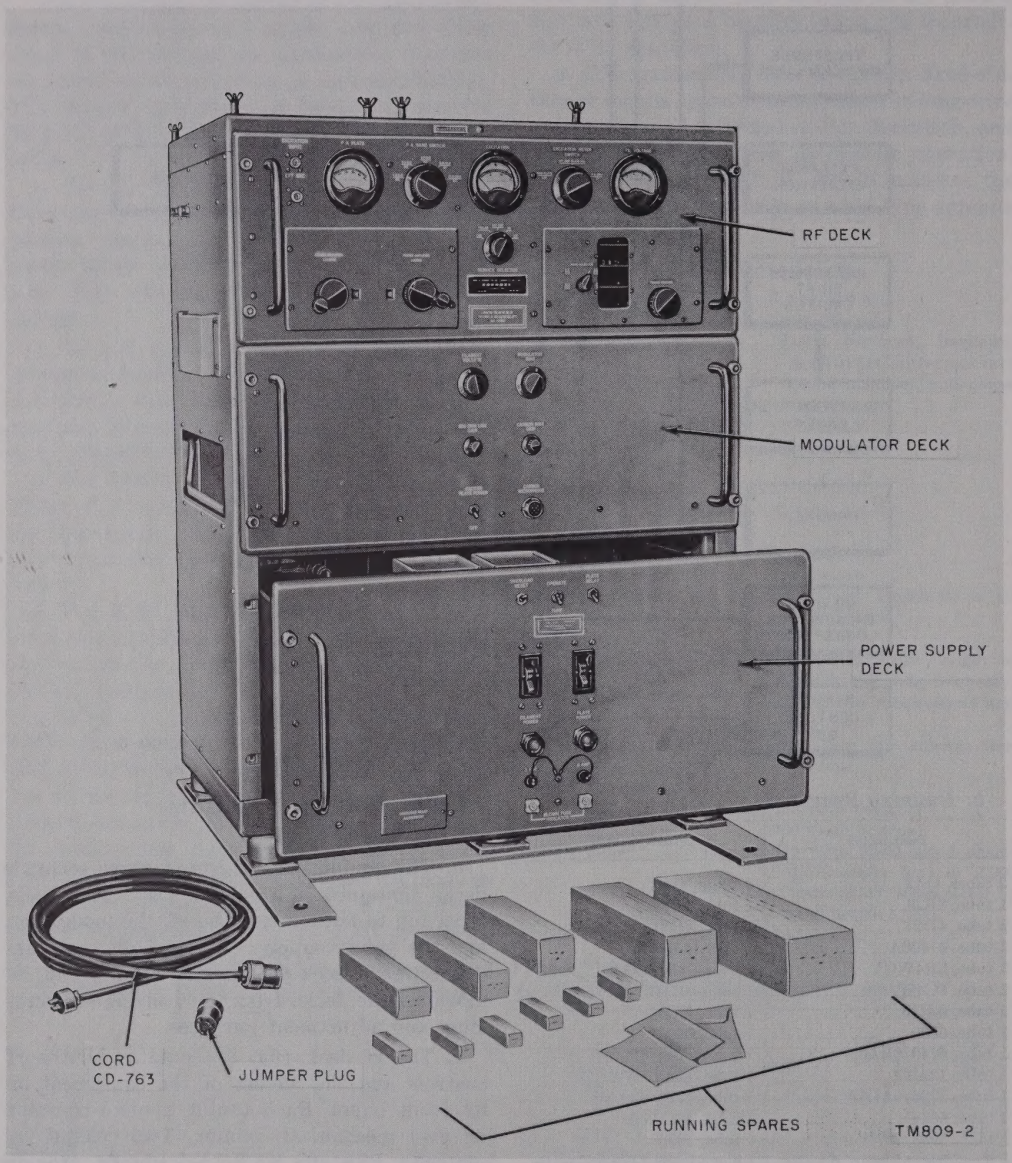


Figure 3. Radio Transmitter T–368/URT, components.

be removed easily for servicing and adjusting.

c. The modulator deck (fig. 3) contains all the modulation controls of the equipment. The chassis contains a speech amplifier subassembly which can be easily removed for testing purposes. A receptacle is provided to connect either a handkey or a microphone to the transmitter.

d. The power supply deck (fig. 3) contains the protection and indicator devices and all of the ac controls except the THERMAL RESET switch of the equipment. A small plate covers the two controls used to adjust the overload relay. The panel lamps, fuses, and blown fuse indicators are located on the front panel.

e. The cabinet contains all the interlock switches of the equipment. Three receptacles are located on the rear of the cabinet (fig. 4). The power receptacle permits the application of ac power, the second receptacle seats the jumper plug to permit high-voltage operation, and the third provides means for remote control operation. Two coaxial receptacles (fig. 5) on the left side of the cabinet connect the transmitting antenna to the transmitter and to a receiver (when used) through an antenna change-over relay. A blower, located on the back panel, improves the ventilation of the equipment; air filters (fig. 4) clean the incoming air. A holder (fig. 5), mounted on the left side, stores the calibration charts used with the transmitter. In Radio Transmitters T–368A/URT and T–368C/URT, the holder is mounted on the right side of the cabinet. Carrying handles for the transmitter (one on each side) when not in use, can be folded into the sides of the housing. A hexagonal T-socket wrench (fig. 4), used for loosening and tightening the panel captive bolts, is mounted in the recess for the right side handle. At the top of the cabinet are two sets of four threaded studs with wing nuts for mounting a switching unit (in Radio Set AN/GLQ–2) or Radio Modulator MD–239/GR (in Radio Set AN/GRD–26D) and an antenna tuning unit (fig. 1). A THERMAL RESET button (fig. 6) on the top of the upper front section of the cabinet permits manual resetting of the thermostat, which is mounted on the inside top of the cabinet. Radio Transmitters T–368/URT and T–368B/URT have six shock mounts (fig. 4) which attach to a flat rectangular plate. On the other transmitters eight shock mounts attach to a U-channel rectangular base; the base is secured to the mounting surface by four bolts (not supplied). The rear aprons of the deck chassis can be reached by loosening the Dzus screws that hold the back panel to the cabinet.

8. Description of Antenna Tuning Unit (fig. 1)

All controls and the meter are mounted on the front panel. Terminals on the side and rear connect the unit to the transmitter and to an antenna. Four spring clasps are mounted on the cover to fasten it to the body. The entire unit is mounted on top of the transmitter and is secured by four wing nuts. The unit weighs 48 pounds.

9. Additional Equipment Required

The additional equipment required for the operation of the transmitter depends on the type of service to be performed. In all types of installations, it is necessary to have a power source of 115 volts ac, 2,200 watts minimum; a frequency calibrating device; and an antenna system. The following basic equipment is required for the five types of operation of the transmitter:

a. Cw operation requires a handkey such as Key KY–116/U with Special Purpose Cable Assembly CX–1852/U or equivalent.

b. AM operation requires a handkey such as phone such as Microphone M–29A/U with its cable or its equivalent. For remote control operation, a telephone set that works through a 600-ohm line is connected to remote control receptacle J12.

c. FSK operation of Radio Transmitter T–368/URT requires the use of an exciter unit such as Frequency Shift Exciter O–39/TRA–7, O–39A/TRA–7, O–39B/TRA–7, or O–39C/TRA–7, or its equivalent and a teletypewriter such as Teletypewriter TT–4A/TG or its equivalent. Radio Transmitters T–368A/URT, T–368B/URT, and T–368C/URT are designed for FSK operation in conjunction with Radio Modulator MD–239/GR, or its equivalent, and a teletypewriter.

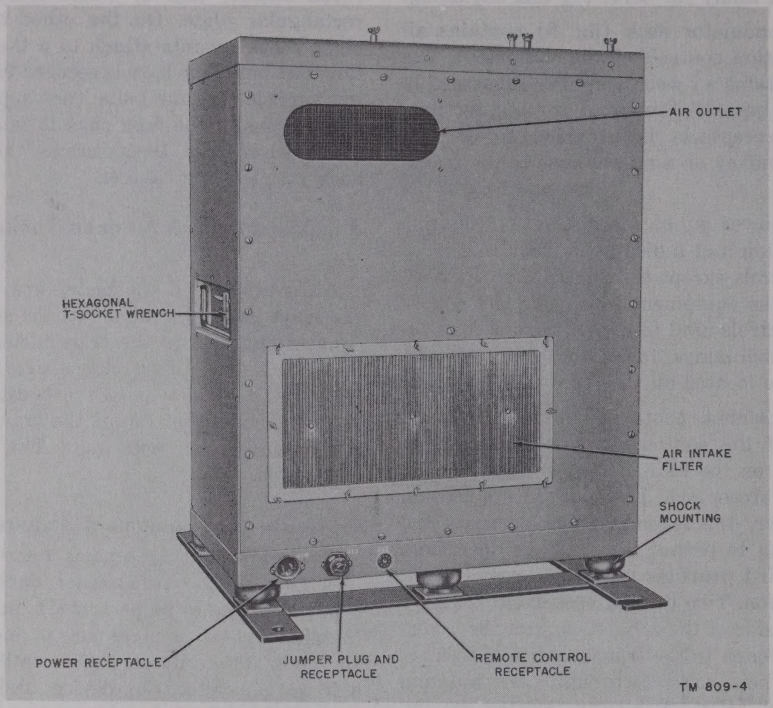


Figure 4. Transmitter, rear view.

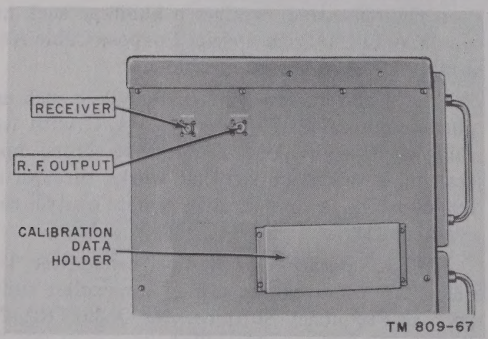


Figure 5. Transmitter housing, left side.

d. FSK-AM operation combines the units used in both AM and FSK operation.

e. EXT EXC operation requires any unit capable of generating rf signals in the 1.5 to 6.0 mc range. The transmitter will accept narrow-band frequency-modulated signals also.

10. Differences in Models

Radio Transmitters T–368/URT, T–368A/-URT, T–368B/URT, and T–368C/URT are similar in purpose, operation, and appearance. The model differences are listed in the following chart:

Item	Basic model	A model	B model	C model
High-voltage plate transformer T9.	Dual primary	Dual primary	Single untapped primary.	Single untapped primary.
	5,760-volt, 475-ma secondary.	6,350-volt, 500-ma secondary.	6,160-volt, 500-ma secondary.	6,336-volt, 500-ma secondary.
Antenna change-over relay system.	Dual relay K1A and K1B used.	K1 replaces K1B	K11 replaces K1B	Same as B model (reference symbols of B and C model components are identical).
		Slow release section K1A replaced by a circuit consisting of tubes V20 and V21, slow release relay K9, and associated components.	Slow release section K1A replaced by a circuit consisting of tubes V21 and V22, slow release relay K9, and associated components.	
Circuit to protect intermediate amplifier tube V104 in the event of loss of excitation.	Not present	Uses relay and vacuum tube circuit including V23 and K10.	Same as A model	Same as A model.
FSK connector	Type UG–58/U	Type UG–910/U	Same as A model	Same as A model.
Exciter power supply tubes.	V4, 5R4WGY	V4 and V22, 5R4WGA	V4 and V20, 5R4WGA	Same as B model.
Exciter plate transformer T3 secondary current rating.	250 ma	300 ma	300 ma	300 ma.
T4 secondary 9–11 current rating.	3-ampere	6-ampere	4-ampere	4-ampere.
Switch S12	TUNE-OPERATE switch.	TUNE-NORMAL switch.	TUNE-OPERATE switch.	TUNE-NORMAL switch.
Switch S6	EXCITER PLATE POWER switch up (on) and OFF positions.	KEYING switch, NORMAL and CONTINUOUS positions.	Same as A model	Same as A model
Exciter power supply	Turned on by EXCITER PLATE POWER switch or plate relay K6.	Energized when FILAMENT POWER switch is set to ON position.	Same as A model	Same as A model.
Blower B2	Associated C36 is 2.75 uf.	Same as basic model	Blower B2 increased in size and requires different mounting facilities. Associated C36 is 4 uf.	Same as basic model.
Keying circuit tubes	None used	Keying diode—V20, 5726/6AL5W.	Keying diode—V21, 5726/6AL5W.	Same as B model.
	None used	Keying relay control—V21, 6AU6WA.	Keying relay control—V22, 6AH6.	Same as B model.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. CONTROLS AND INSTRUMENTS

11. General

Haphazard operation or improper setting of the controls can cause damage to electronic equipment. For this reason, it is important to know the function of every control. The actual operation of the equipment is discussed in paragraphs 14 through 24.

12. Transmitter

(fig. 6)

a. Rf Deck.

Control or instrument	Function
P A PLATE meter	Indicates plate current drawn by power amplifier tube.
P A BAND SWITCH	Five-position switch that permits operation of pa tube in bands of: 1.5–2.0 mc. 2.0–3.0 mc. 3.0–6.0 mc. 6.0–11.0 mc. 11.0–20.0 mc.
EXCITATION METER SWITCH and EXCITATION meter	The positions of the switch and the corresponding functions of the meter are as follows: *Position* — *Function* MOD PLATE X20 — Indicates plate current of modulator tubes; reading multiplied by 20. INT AMP PLATE X10 — Indicates plate current of ipa tube. Reading multiplied by 10. P A GRID X2 — Indicates grid current of pa tube. Reading multiplied by 2.
FIL VOLTAGE meter	Indicates filament voltage of pa tube.
TUNING CONTROL	Tunes all rf stages except the pa.
Tuning control frequency dial (mechanical counter)	Indicates transmitting frequency directly in mc on one of four rows of dials. Row (for each band) selected by BAND SELECTOR switch.
BAND SELECTOR switch	Selects following bands over which the transmitter exciter section operates: 1.5–3.0 mc. 3.0–6.0 mc. 6.0–12.0 mc. 12.0–20.0 mc. Counter containing frequencies in desired band exposed by action of BAND SELECTOR switch.
SERVICE SELECTOR switch	Selects any one of the following five types of operation: Cw AM FSK FSK-AM EXT EXC
POWER AMPLIFYING TUNING control	Adjusts the pa stage to operating frequency. Initial setting determined from the calibration charts. Final setting found during tuning procedure (par. 17).
POWER AMPLIFIER LOADING control	Adjusts the pa stage to desired loading level. Initial setting determined from the calibration charts. Final setting found during tuning procedure (par. 17).
POWER AMPLIFIER TUNING and LOADING dials (mechanical counters)	Indicate settings of pa tuning controls.

b. Modulator Deck

Control or instrument	Function
FILAMENT VOLTAGE control	Adjusts filament voltage for pa tube (indicated on FIL VOLTAGE meter).
MODULATOR BIAS control	Sets no-signal modulator plate current (shown on EXCITATION meter in MOD PLATE X20 position).
600 OHM LINE GAIN control	Sets audio input level to equipment when using a telephone set.
CARBON MIKE GAIN control	Sets audio input level to equipment when using a carbon mike.
EXCITER PLATE POWER switch (basic model only)	Turns on exciter power supply and removes blocking bias for FSK, FSK-AM, and EXT EXC operation when in on (up) position. Left in OFF position for cw and AM operation, and exciter supply is turned on by PLATE RELAY switch for cw and by closing the mike switch for AM.
KEYING switch (in lettered models)	Removes blocking bias for EXT EXC, FSK, or FSK-AM operation when in CONTINUOUS position. In NORMAL position for cw and AM operation.

c. Power Supply Deck.

Control or instrument	Function
FILAMENT POWER circuit breaker	Applies ac line power to equipment when in ON position.
PLATE POWER circuit breaker	Applies high voltage to equipment when in ON position and when either the PLATE RELAY switch is in the on (up) position or the mike switch is closed. In either case, the high voltage cannot be turned on until approximately 25 seconds have passed after the FILAMENT POWER circuit breaker is closed.
OVERLOAD RESET switch	When pressed down momentarily restarts equipment after overloads. Normally kept at off (up) position by a spring.
TUNE-OPERATE (TUNE-NORMAL in A and C models) switch	When set at TUNE, lowers high voltage of equipment. When set at OPERATE (NORMAL in A and C models), applies normal high voltage to equipment.
PLATE RELAY switch	Turns on high voltage when PLATE POWER circuit breaker and PLATE RELAY switch are set at their on (up) positions. In the basic model only, also turns on exciter power supply when set to on position. Switch is left in on position for all services except AM operation. In AM operation, high voltage is obtained by closing the mike switch.
FILAMENT POWER indicator light (green)	Indicates presence of ac power in equipment.
PLATE POWER indicator light (red)	Indicates high voltage power supply is on.
3 AMP fuse	Protects bias supply transformer and blower motor (located on the back panel).
6 AMP fuse	Protects filament, low-voltage circuits, and blower motor (located on rf deck).
BLOWN FUSE INDICATORS	Indicators for 3 AMP and 6 AMP fuses for blow conditions.

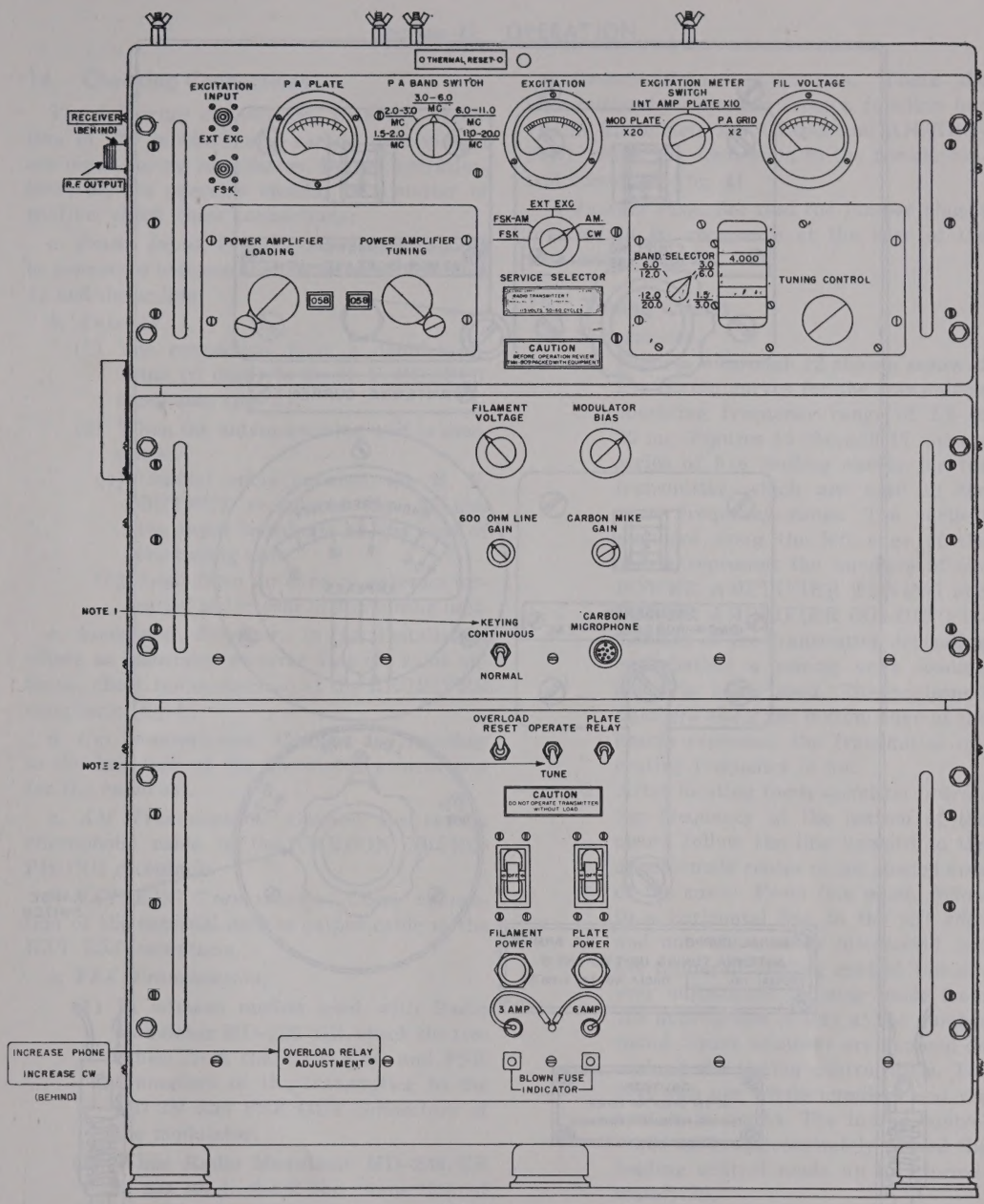
d. Housing Control.

Control or instrument	Function
THERMAL RESET push button switch	Permits manual resetting of thermostat.

13. Antenna Tuning Unit (fig. 7)

Control or instrument	Function
COUPLING control	Varies the amount of current in the antenna.
FREQUENCY control 10 MC-INCREASE–20 MC.	Adjusts the antenna loading to the transmitter in the high-frequency range.
FREQUENCY control 2 MC-INCREASE–10 MC.	Adjusts the antenna loading to the transmitter in the low-frequency range.

Control or instrument	Function
ANTENNA CURRENT meter	Measures the rf current in the antenna.
Range switch	Three-position switch to match a whip antenna in either the low-frequency (2 to 10 mc) or high-frequency (10 to 20 mc) range of the transmitter or to match a long-wire antenna to the 2- to 20-mc range of the transmitter.



NOTES:

1. IN BASIC MODEL, KEYING SWITCH IS CALLED EXCITER PLATE POWER WITH OFF IN DOWN POSITION
2. IN A AND C MODELS, OPERATE POSITION IS LABELED NORMAL

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Figure 6. Transmitter front panel.

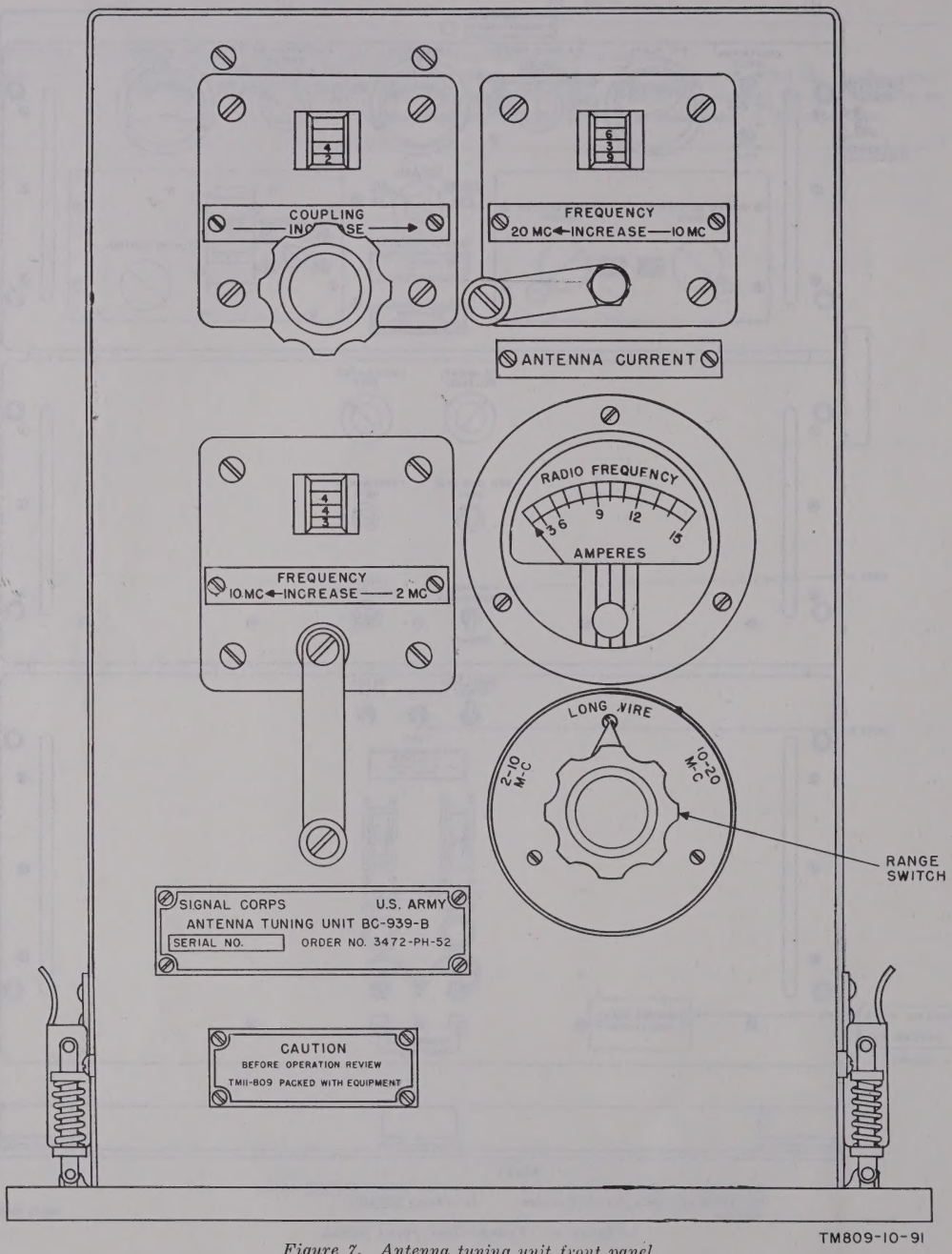

Figure 7. Antenna tuning unit front panel.

14. Checking Connections

The following connections, with the exception of the handkey and carbon microphone, are made during installation. Before operation, however, the operator should, as a matter of routine, check these connections:

a. Power Input. Power Cord CD–763 should be connected between the power receptacle (fig. 4) and the ac line.

b. Antenna.

(1) The connection from a doublet antenna (if used) to the R. F. OUTPUT receptacle (fig. 5).

(2) When the antenna tuning unit is used, check:

(*a*) Coaxial cable between the R. F. OUTPUT receptacle (fig. 5) and the input terminals on the side of the tuning unit.

(*b*) Lead from antenna to antenna terminal at the rear of the tuning unit.

c. Associated Receiver. In an installation where an associated receiver uses the same antenna, check the connection at the RECEIVER receptacle (fig. 5).

d. Cw Transmission. Connect the handkey to the key jack at the associated control box for the radio set.

e. AM Transmission. Connect the carbon microphone cable to the CARBON MICROPHONE receptacle.

f. EXT EXC Transmission. Check connection of the external exciter output cable to the EXT EXC receptacle.

g. FSK Transmission.

(1) In lettered models used with Radio Modulator MD–239/GR, check the two cables from the EXT EXC and FSK connectors of the transmitter to the MO IN and FSK OUT connectors of the modulator.

(2) When Radio Modulator MD–239/GR is not used, check the connection of the frequency-shift exciter cable to the FSK receptacle.

h. FSK-AM Transmission. Make the checks given in *e* and *g*(1) or (2) above.

i. Remote Control Operation. Where the transmitter is controlled from a junction box (as in Radio Sets AN/GLQ–2 and AN/GRC–26D), check the connection to the remote control receptacle (fig. 4).

j. Jumper Plug. See that the jumper plug is inserted in its receptacle at the rear of the transmitter (fig. 4).

15. Tuning Charts

a. Transmitter.

(1) Figures 8 through 12 show a series of five *tuning* curves for the transmitter operating frequency range of 1.5 to 20 mc. Figures 13 through 17 show a series of five *loading* curves for the transmitter which are used in the same frequency range. The vertical numbers along the left edge of the charts represent the numbers of the POWER AMPLIFIER TUNING and POWER AMPLIFIER LOADING indicators of the transmitter depending on whether a tuning or a loading chart is being used. The horizontal numbers along the bottom edge of the charts represent the transmitter operating frequency in mc.

(2) After locating the transmitter operating frequency at the bottom of the chart, follow the line upward to the approximate center of the shaded area of the curve. From this point, follow in a horizontal line to the left edge and note the number intersected. Set the tuning or loading control (whichever adjustment is being made from the appropriate chart) at the number found. Three numbers are exposed on each of the tuning control dials. The first two are whole numbers and the next is in tenths. The tuning control reads up to approximately 25 and the loading control reads up to approximately 30.

b. Antenna Tuning Unit BC–939–B. Appropriate control settings for the tuning unit when used with Radio Transmitter T–368(*)/URT are given in (1) and (2) below.

(1) *2- to 10-mc range.*

Operating frequency (mc)	Range switch position	COUPLING control setting	Loading (FREQUENCY control, 2 mc to 10 mc)
2.00	2–10	4.9	4.6
2.05	2–10	4.9	7.1
2.10	2–10	5.1	9.4
2.15	2–10	4.9	11.4
2.20	2–10	4.8	13.3
2.25	2–10	4.7	15.1
2.30	2–10	4.6	16.8
2.35	2–10	4.5	18.3
2.40	2–10	4.5	19.8
2.45	2–10	4.6	21.3
2.50	2–10	4.6	22.6
2.55	2–10	4.3	23.9
2.60	2–10	4.3	25.0
2.65	2–10	4.2	26.2
2.70	2–10	4.2	27.3
2.75	2–10	4.2	28.3
2.80	2–10	4.2	29.3
2.85	2–10	4.2	30.2
2.90	2–10	4.5	31.0
2.95	2–10	4.1	32.0
3.00	2–10	4.1	32.7
3.05	2–10	4.1	33.5
3.10	2–10	4.1	34.2
3.15	2–10	4.2	35.0
3.20	2–10	4.2	35.6
3.25	2–10	4.3	36.3
3.30	2–10	4.3	37.0
3.35	2–10	4.5	37.5
3.40	2–10	4.5	38.2
3.45	2–10	4.3	38.7
3.50	2–10	4.2	38.9
3.55	2–10	4.1	39.5
3.60	2–10	4.0	39.9
3.65	2–10	4.0	40.4
3.70	2–10	4.0	40.9
3.75	2–10	4.1	41.3
3.80	2–10	4.1	41.7
3.85	2–10	4.1	42.2
3.90	2–10	4.1	42.5
3.95	2–10	4.2	42.9
4.00	2–10	4.2	43.2
4.05	2–10	4.0	43.7
4.10	2–10	4.0	44.0
4.15	2–10	3.9	44.3
4.20	2–10	3.8	44.6
4.25	2–10	3.8	44.9
4.30	2–10	3.6	45.2
4.35	2–10	3.4	45.5
4.40	2–10	3.4	45.8
4.45	2–10	3.1	46.1
4.50	2–10	2.9	46.2
4.55	2–10	2.9	46.4
4.60	2–10	2.8	46.7
4.65	2–10	2.8	46.9
4.70	2–10	2.8	47.2
4.75	2–10	2.8	47.4
4.80	2–10	2.7	47.6
4.85	2–10	2.7	47.9
4.90	2–10	2.7	48.1
4.95	2–10	2.7	48.3
5.00	2–10	2.7	48.5
5.05	2–10	2.7	48.7
5.10	2–10	2.7	48.9
5.15	2–10	2.6	49.1
5.20	2–10	2.6	49.3
5.25	2–10	2.6	49.5
5.30	2–10	2.5	49.6
5.35	2–10	2.5	49.8
5.40	2–10	2.5	50.0
5.45	2–10	2.5	50.1
5.50	2–10	2.5	50.4
5.55	2–10	2.5	50.5
5.60	2–10	2.5	50.7
5.65	2–10	2.4	50.9
5.70	2–10	2.3	50.9
5.75	2–10	2.3	51.0
5.80	2–10	2.3	51.2
5.85	2–10	2.3	51.3
5.90	2–10	2.3	51.4
5.95	2–10	2.3	51.5
6.00	2–10	2.3	51.7
6.05	2–10	2.3	51.9
6.10	2–10	2.3	51.9
6.15	2–10	2.3	52.0
6.20	2–10	2.3	52.2
6.25	2–10	2.3	52.3
6.30	2–10	2.2	52.5
6.35	2–10	2.2	52.5
6.40	2–10	2.2	52.7
6.50	2–10	2.2	53.0
6.60	2–10	2.1	53.1
6.70	2–10	2.0	53.4
6.80	2–10	2.0	53.6
6.90	2–10	2.0	53.7
7.00	2–10	1.9	54.0
7.10	2–10	1.8	54.2
7.20	2–10	1.8	54.4
7.30	2–10	1.8	54.5
7.40	2–10	1.8	54.7
7.50	2–10	1.7	54.9
7.60	2–10	1.7	55.1
7.70	2–10	1.6	55.2
7.80	2–10	1.6	55.4
7.90	2–10	1.6	55.5
8.00	2–10	1.6	55.7
8.10	2–10	1.5	55.7
8.20	2–10	1.5	55.9
8.30	2–10	1.5	56.1
8.40	2–10	1.5	56.1
8.50	2–10	1.5	56.2
8.60	2–10	1.5	56.4
8.70	2–10	1.5	56.5
8.80	2–10	1.5	56.7
8.90	2–10	1.5	56.8
9.00	2–10	1.5	57.1

Operating frequency (mc)	Range switch position	COUPLING control setting	Loading (FREQUENCY control, 2 mc to 10 mc)
9.10	2–10	1.5	57.3
9.20	2–10	1.5	57.4
9.30	2–10	1.5	57.5
9.40	2–10	1.5	57.7
9.50	2–10	1.5	57.7
9.60	2–10	1.5	57.8
9.70	2–10	1.5	58.0
9.80	2–10	1.4	58.3
9.90	2–10	1.4	58.4
10.00	2–10	1.4	58.5

(2) *10- to 20-mc range.*

Operating frequency (mc)	Range switch position	COUPLING control setting	Loading (FREQUENCY control, 10 mc to 20 mc)
10.00	10–20	1.1	2.5
10.10	10–20	1.1	2.7
10.20	10–20	1.1	3.0
10.30	10–20	1.1	3.4
10.40	10–20	1.1	3.7
10.50	10–20	1.1	4.0
10.60	10–20	1.1	4.5
10.70	10–20	1.1	4.7
10.80	10–20	1.1	5.0
10.90	10–20	1.1	5.3
11.00	10–20	1.1	5.7
11.10	10–20	1.2	5.8
11.20	10–20	1.2	6.1
11.30	10–20	1.2	6.5
11.40	10–20	1.2	6.7
11.50	10–20	1.2	7.0
11.60	10–20	1.2	7.1
11.70	10–20	1.2	7.4
11.80	10–20	1.2	7.7
11.90	10–20	1.2	7.9
12.00	10–20	1.2	8.1
12.10	10–20	1.2	8.4
12.20	10–20	1.1	8.6
12.30	10–20	1.1	8.8
12.40	10–20	1.1	9.0
12,50	10–20	1.1	9.2
12.60	10–20	1.1	9.5
12.70	10–20	1.1	9.8
12.80	10–20	1.1	9.9
12.90	10–20	1.1	10.0
13.00	10–20	1.1	10.3
13.10	10–20	1.1	10.4
13.20	10–20	1.1	10.7
13.30	10–20	1.1	10.8
13.40	10–20	1.1	11.0
13.50	10–20	1.1	11.2
13.60	10–20	1.1	11.3
13.70	10–20	1.1	11.6
13.80	10–20	1.1	11.6
13.90	10–20	1.1	11.8
14.00	10–20	1.1	11.9
14.20	10–20	1.1	12.3
14.40	10–20	1.1	12.4
14.60	10–20	1.1	12.8
14.80	10–20	1.1	13.0
15.00	10–20	1.1	13.2
15.20	10–20	1.1	13.6
15.40	10–20	1.0	13.8
15.60	10–20	1.0	14.2
15.80	10–20	1.0	14.2
16.00	10–20	1.0	14.4
16.20	10–20	1.0	14.6
16.40	10–20	.9	14.7
16.60	10–20	.9	14.7
16.80	10–20	.8	14.9
17.00	10–20	.8	15.1
17.20	10–20	.8	15.4
17.40	10–20	.7	15.4
17.60	10–20	.5	15.6
17.80	10–20	.4	16.0
18.00	10–20	.4	16.3
18.20	10–20	.4	16.4
18.40	10–20	.4	16.7
18.60	10–20	.3	17.0
18.80	10–20	.3	17.2
19.00	10–20	.3	17.4
19.20	10–20	.3	17.6
19.40	10–20	.2	17.9
19.60	10–20	.2	18.3
19.80	10–20	.2	18.5
20.00	10–20	.1	18.7

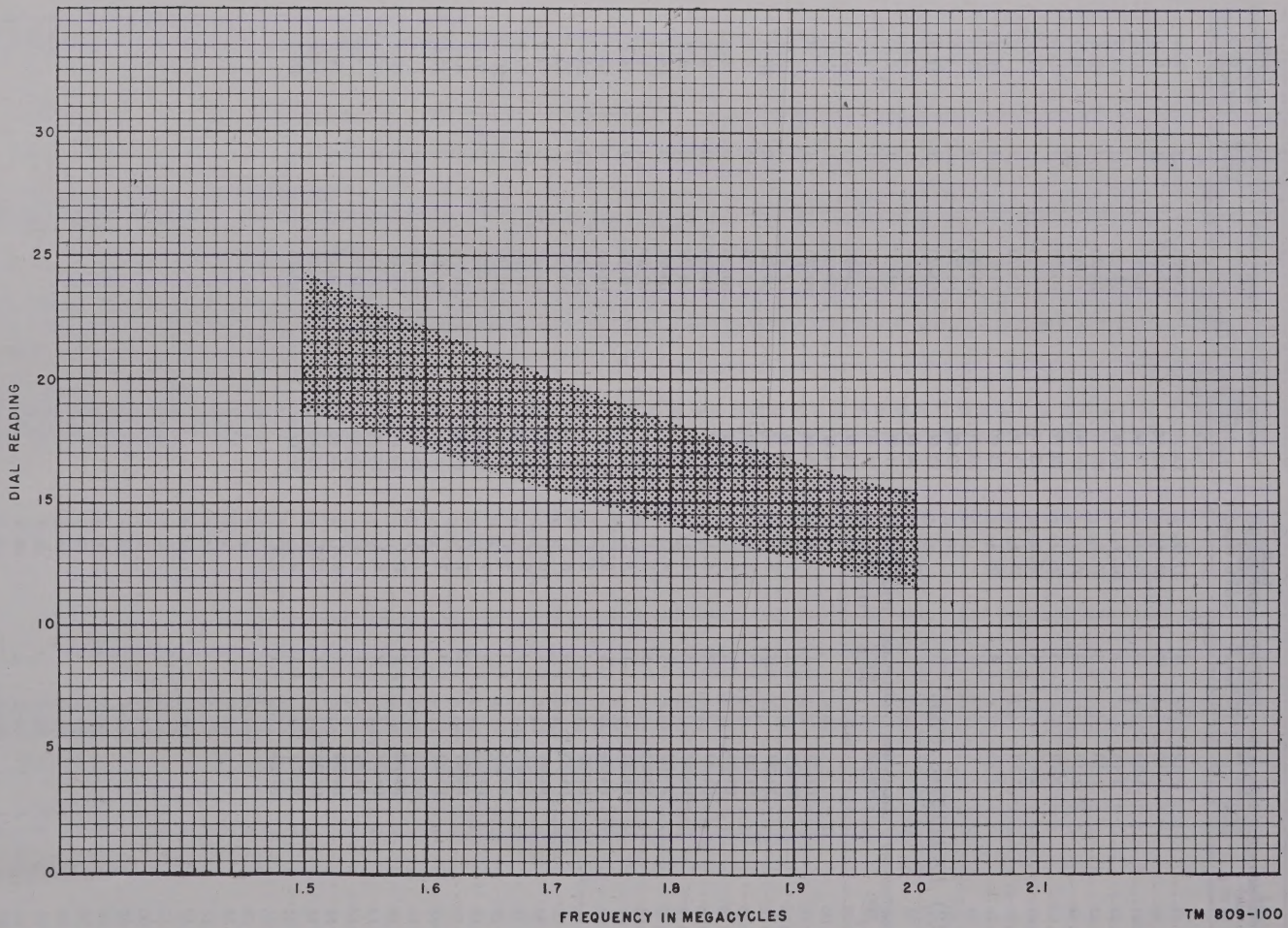

Figure 8. POWER AMPLIFIER TUNING control calibration chart, 1.5 to 2.0 mc.

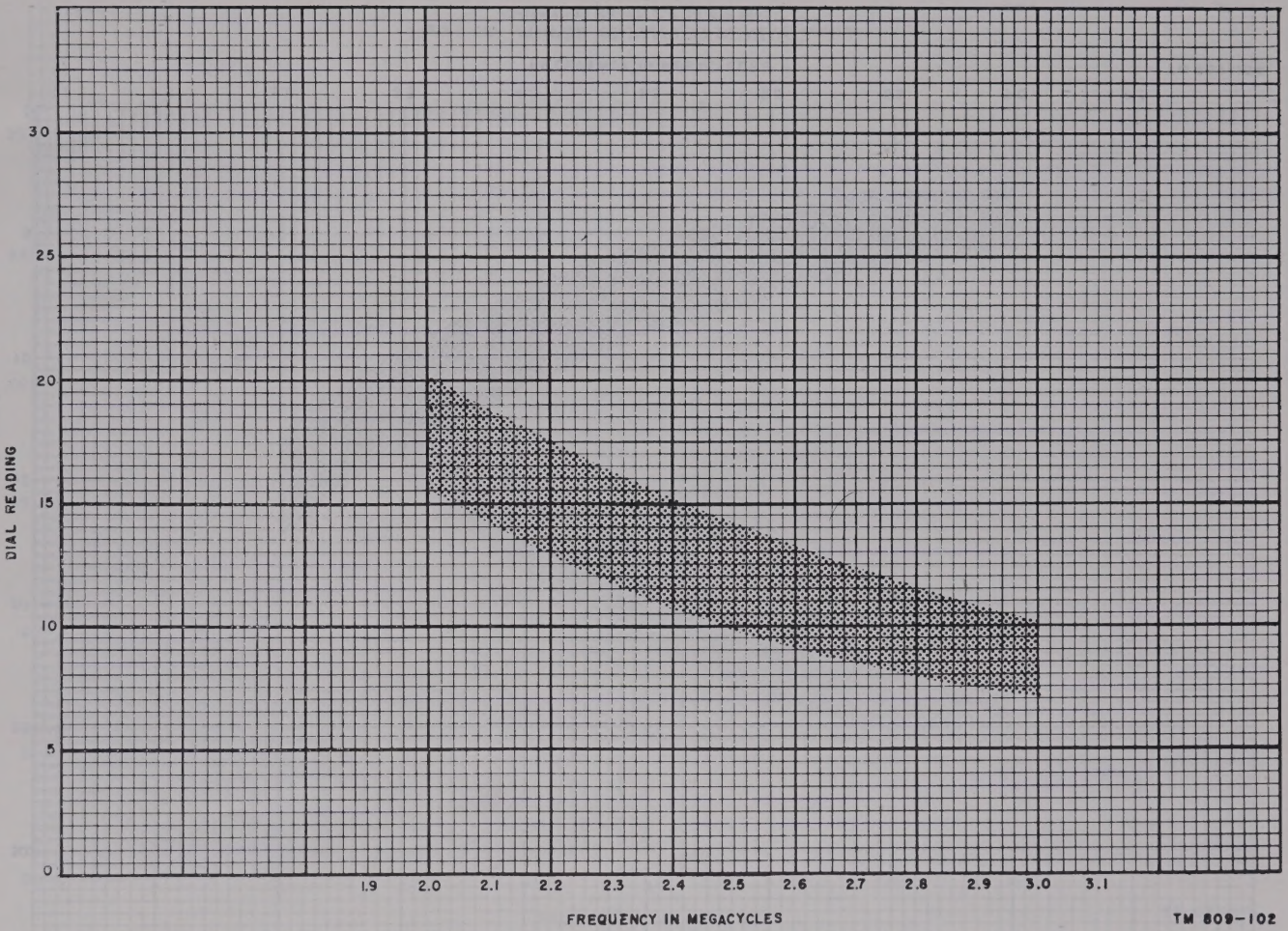

Figure 9. POWER AMPLIFIER TUNING control calibration chart, 2.0 to 3.0 mc.

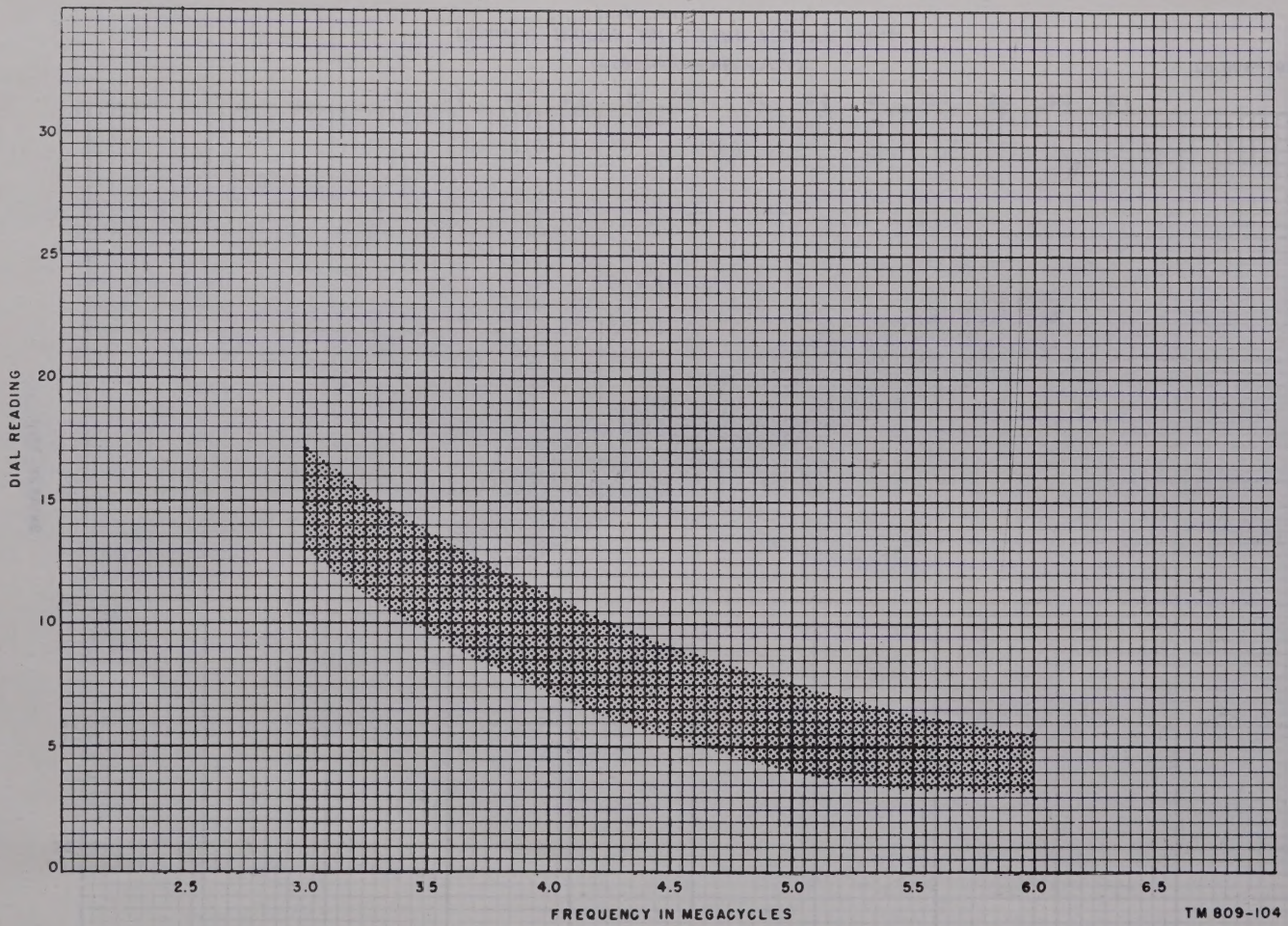

Figure 10. POWER AMPLIFIER TUNING control calibration chart, 3.0 to 6.0 mc.

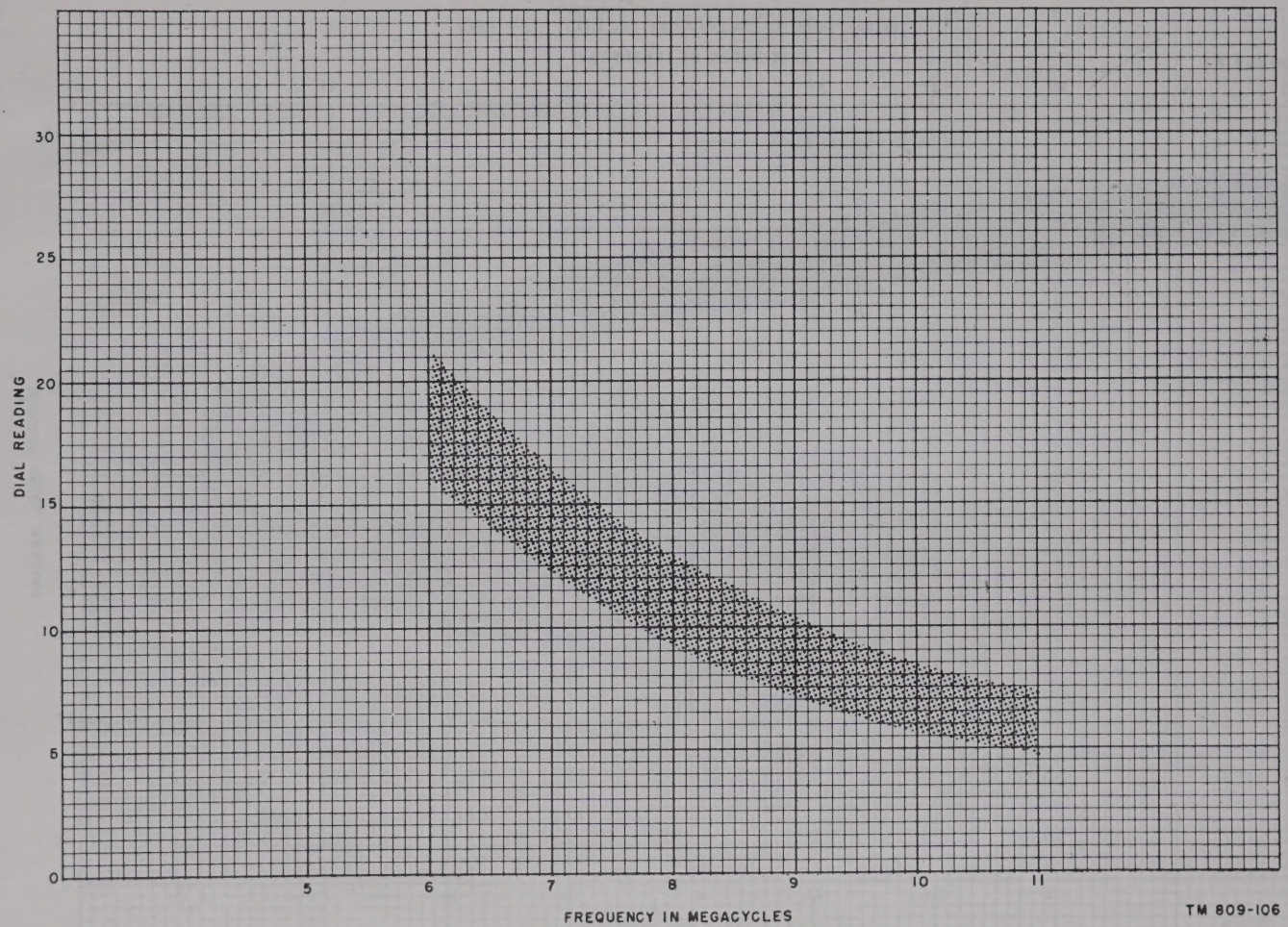

Figure 11. POWER AMPLIFIER TUNING control calibration chart, 6 to 11 mc.

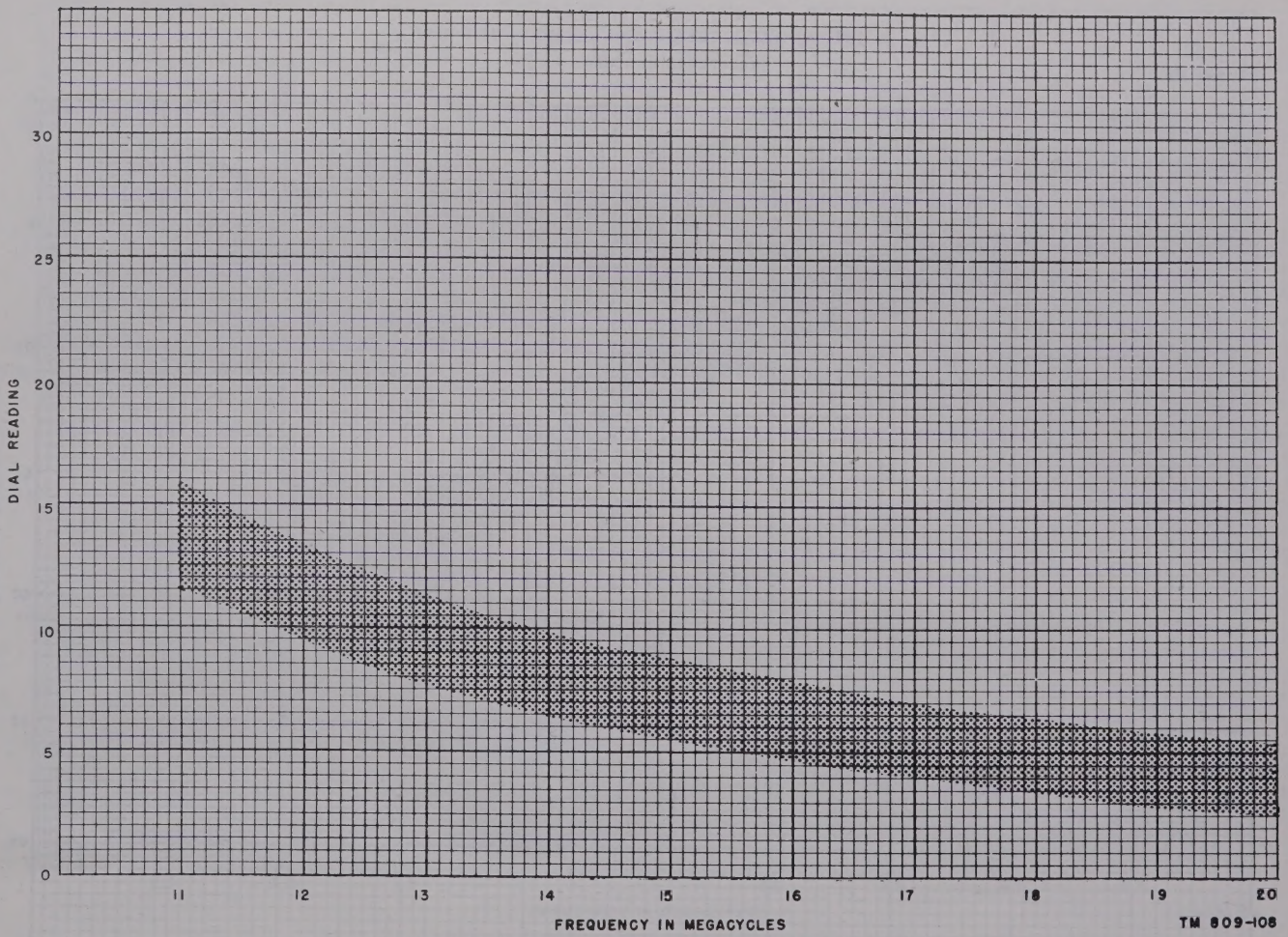

Figure 12. POWER AMPLIFIER TUNING control calibration chart, 11 to 20 mc.

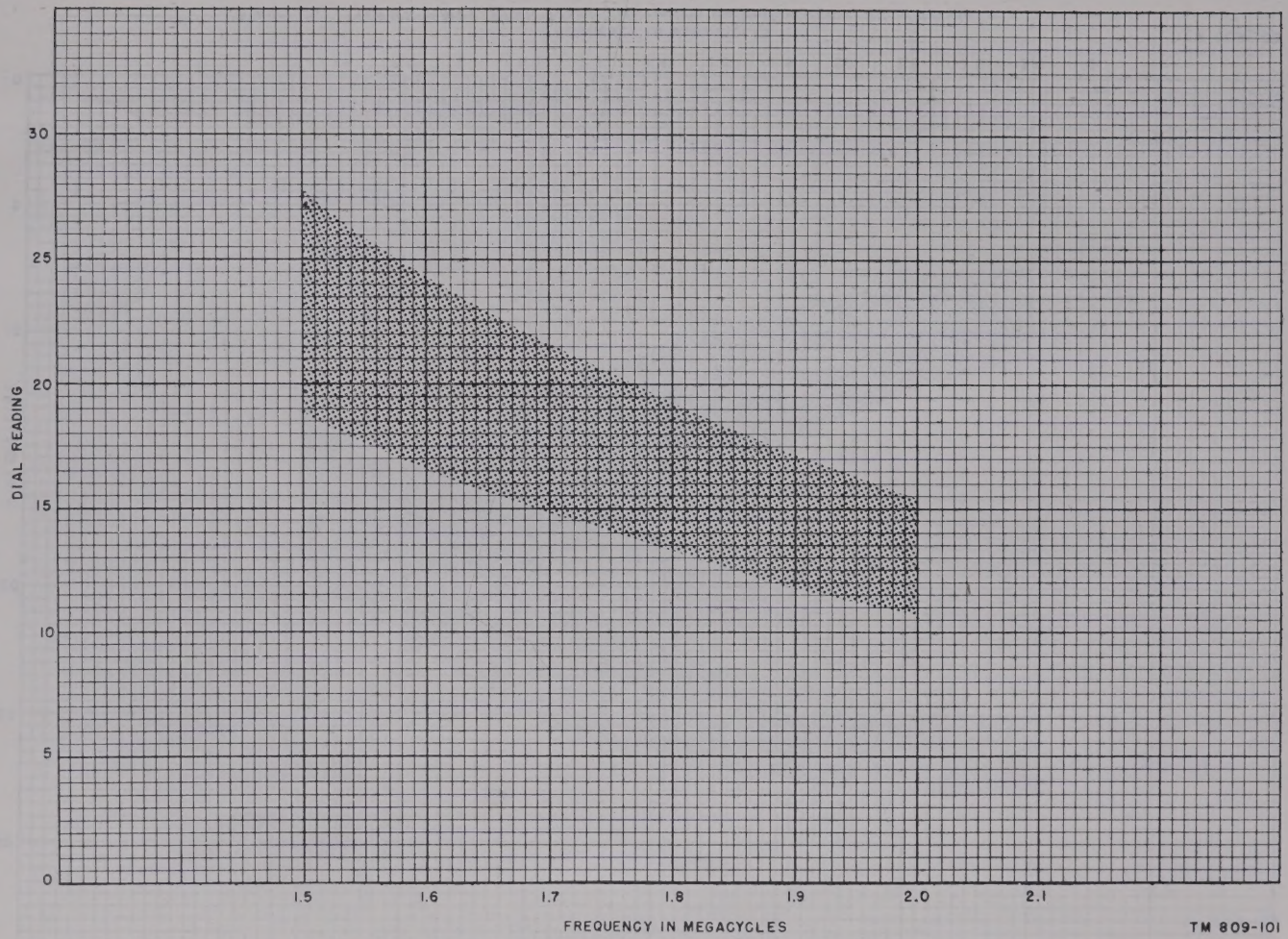

Figure 13. POWER AMPLIFIER LOADING control calibration chart, 1.5 to 2.0 mc.

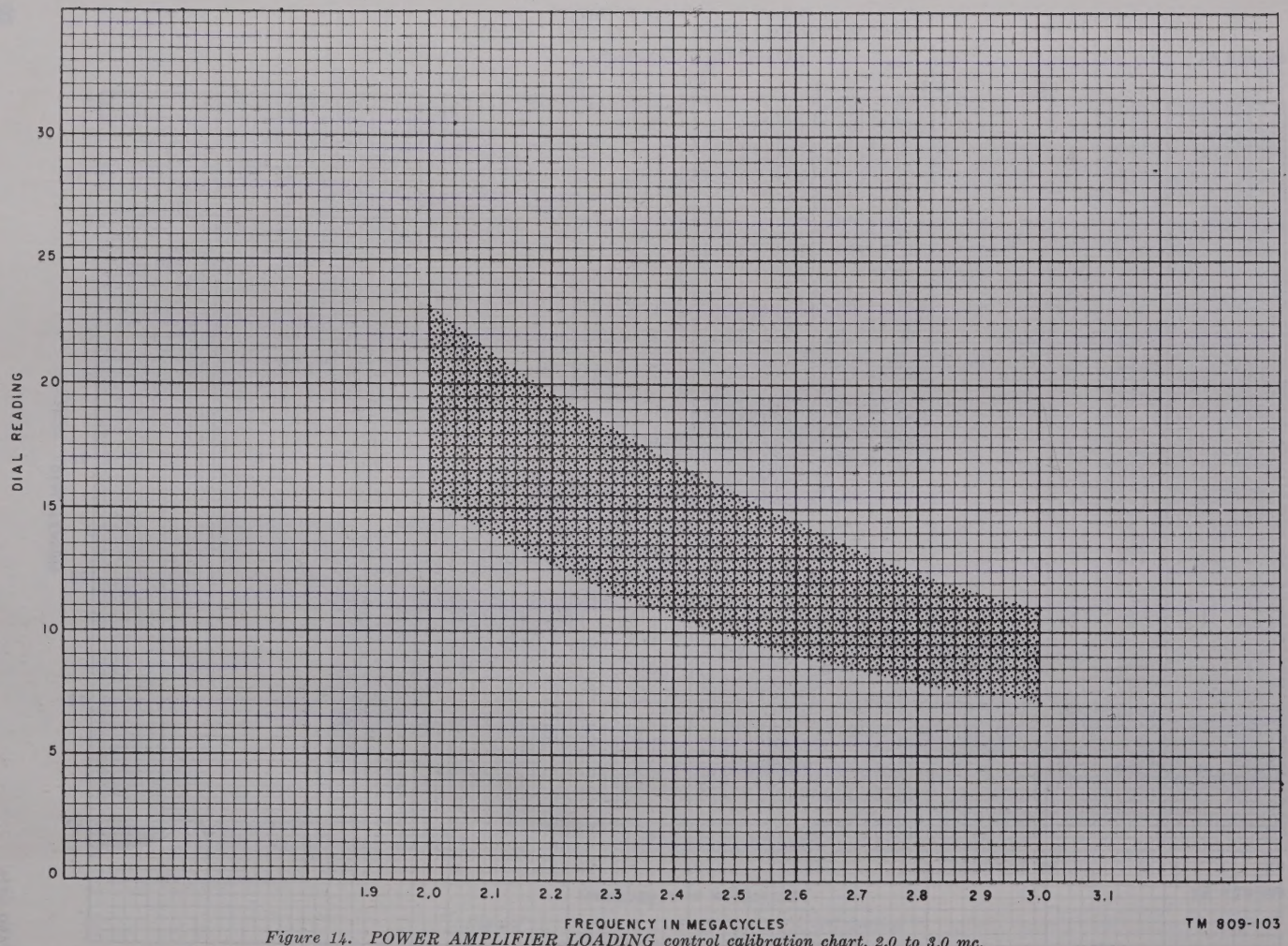

Figure 14. POWER AMPLIFIER LOADING control calibration chart, 2.0 to 3.0 mc.

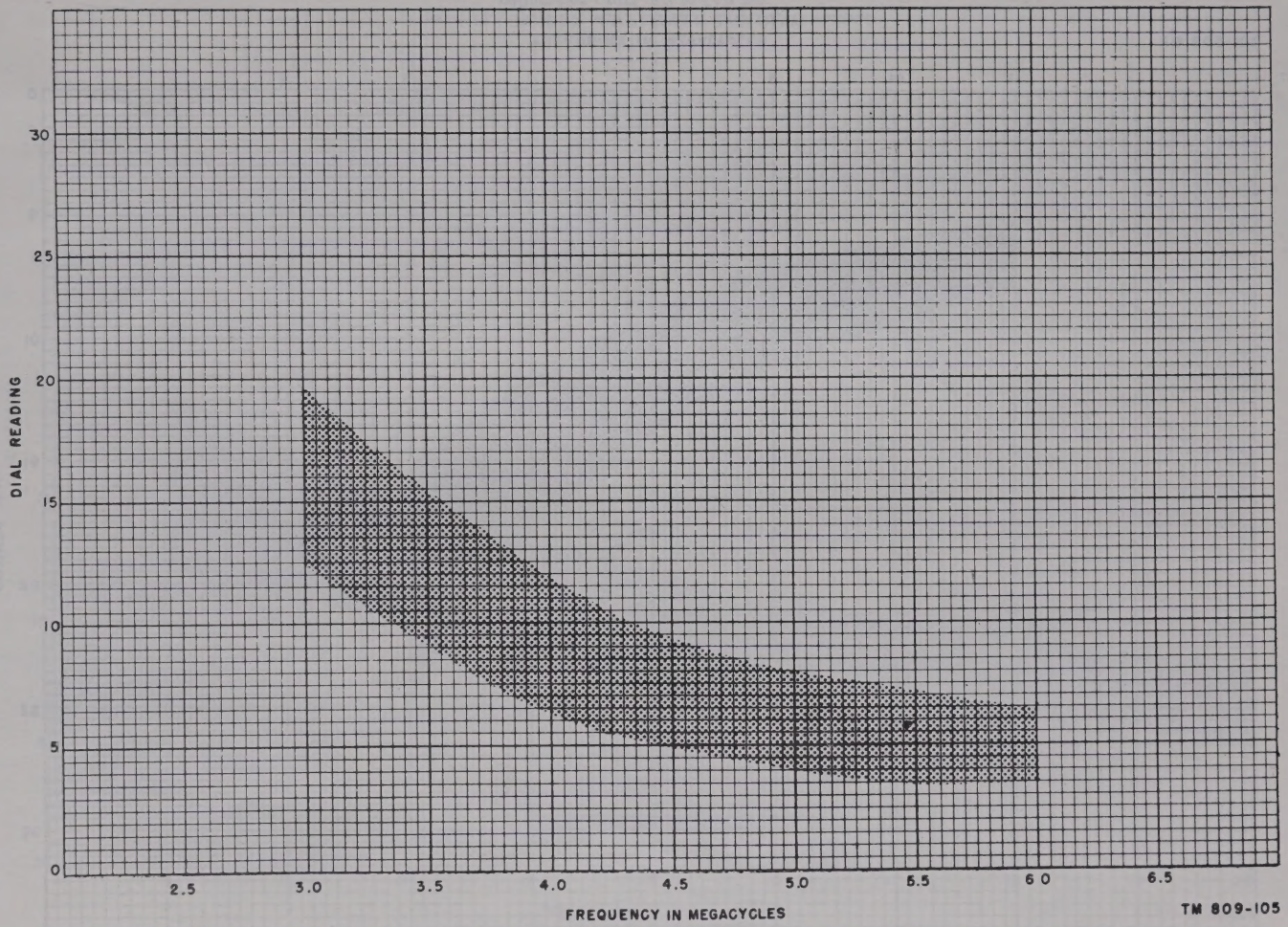

Figure 15. POWER AMPLIFIER LOADING control calibration chart, 3.0 to 6.0 mc.

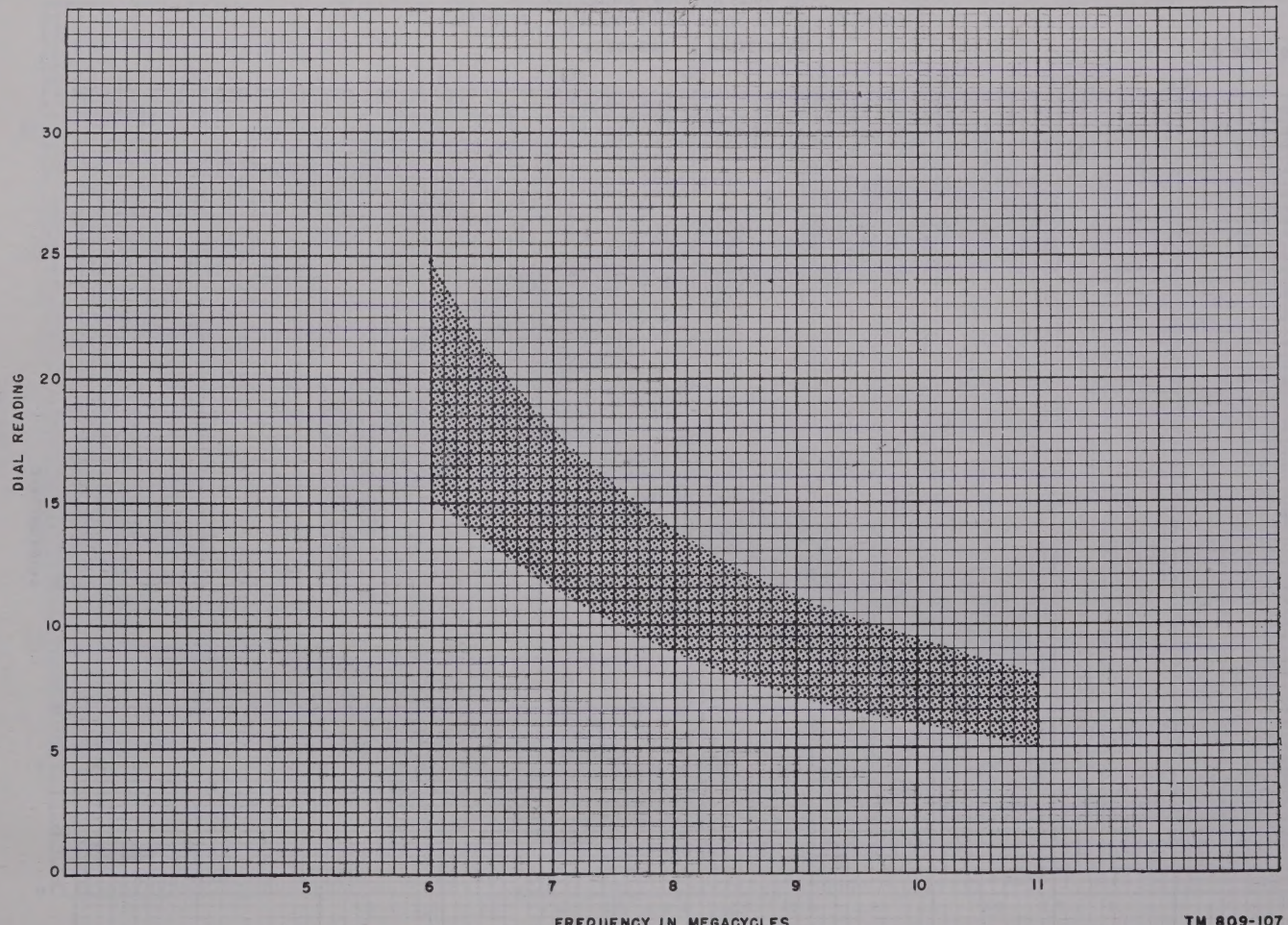

Figure 16. POWER AMPLIFIER LOADING control calibration chart, 6.0 to 11.0 mc.

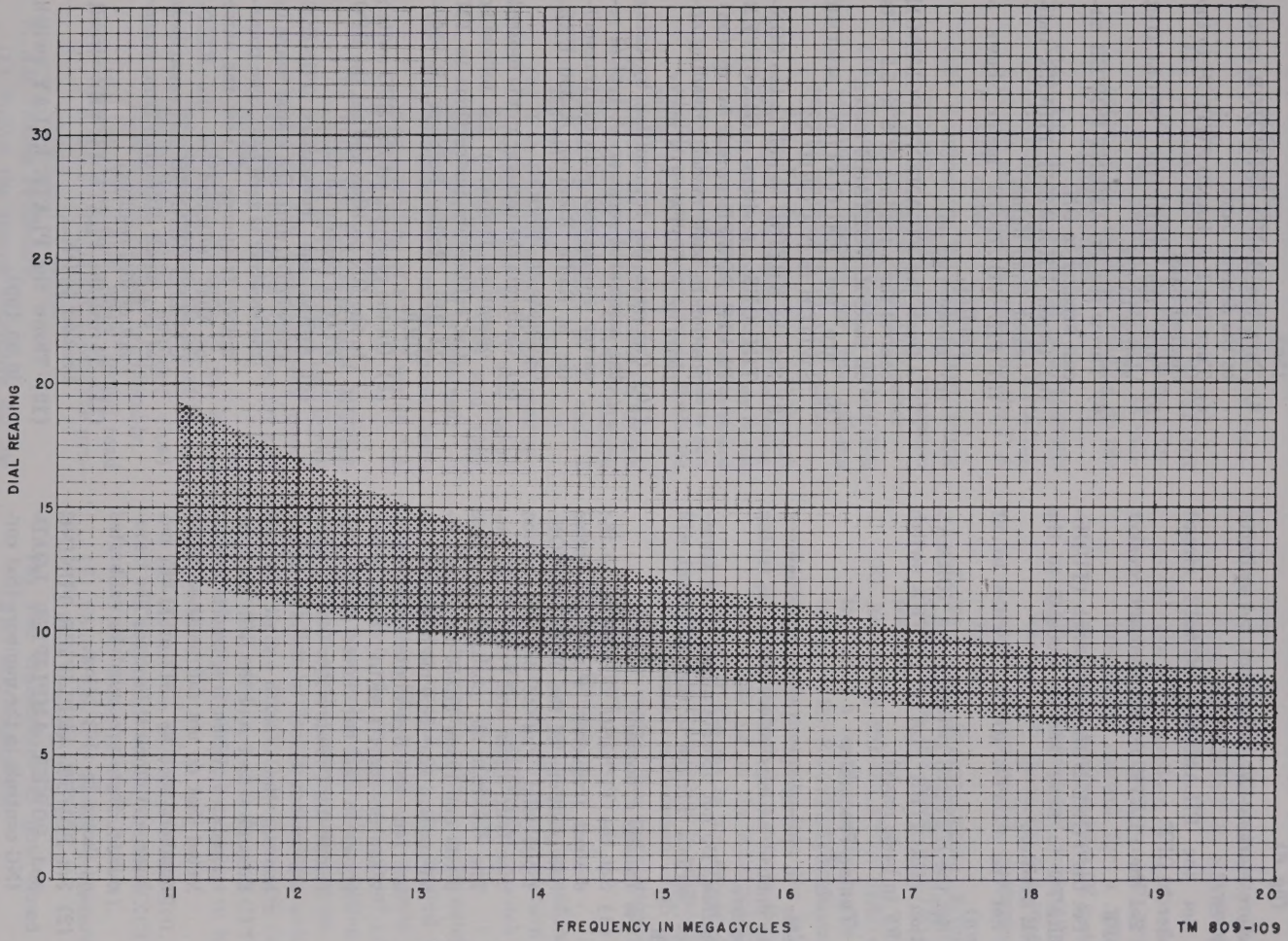

Figure 17. POWER AMPLIFIER LOADING control calibration chart, 11 to 20 mc.

16. Preliminary Starting Procedure (fig. 6)

Before starting the equipment, set switches as follows:

a. Set the FILAMENT POWER circuit breaker to OFF.

b. Set the PLATE POWER circuit breaker to OFF.

c. Set the TUNE-NORMAL switch (TUNE-OPERATE in basic and B models) to the TUNE position.

d. Set the PLATE RELAY switch to off (down).

e. Set the KEYING switch to the NORMAL position (EXCITER PLATE POWER switch to OFF in basic model).

17. Tuning Procedure (fig. 6)

Refer to paragraph 16 for preliminary power control settings before using the tuning procedure.

Caution: Do not operate an unloaded transmitter; serious damage to the equipment will result.

a. Cw Tuning Procedure.

(1) Set the TUNING CONTROL to the desired frequency. Figure 18 shows two positions of the TUNING CONTROL dial. The 1.5–3.0 mc position uses four digits and reads 1.920 mc. The 6.0–12.0 mc position uses five digits and reads 11.350 mc. The 3.0–6.0 mc and 12.0–20.0 mc positions also use four and five digits respectively. When the BAND SELECTOR switch is set in the two lower bands, the fourth digit reads either 0 or 5; when the switch is set in the two upper bands, the fourth digit travels through 0 to 9 and the fifth digit remains at 0. When frequencies are selected that do not fall on these exact numbers such as 1.917 or 11.357 mc, interpolation must be used. The transmitter, therefore, must be calibrated as shown in (10) below.

(2) Set POWER AMPLIFIER TUNING and POWER AMPLIFIER LOADING controls to the numbers that correspond to the desired frequency (par. 15*a*).

(3) Turn the BAND SELECTOR switch to the desired band.

(4) Turn the P A BAND SWITCH to the desired band.

(5) Turn the SERVICE SELECTOR switch to Cw.

(6) Throw the FILAMENT POWER circuit breaker to ON.

(*a*) Green FILAMENT POWER indicator lamp lights.

(*b*) FIL VOLTAGE meter shows a reading.

(*c*) Blowers go on.

(7) Adjust the FILAMENT VOLTAGE control for a reading of 5 to 5.2 volts on the FIL VOLTAGE meter.

(8) Turn the EXCITATION METER SWITCH to P A GRID X2.

(9) Set the KEYING switch to the CONTINUOUS position (EXCITER PLATE POWER switch to up (on) position in basic model). Reading appears on EXCITATION meter.

(10) Calibrate the transmitter by using the associated receiver. A typical receiver used in sets with the transmitter is Radio Receiver R–390/URR. Calibrate as follows:

(*a*) Calibrate the receiver to the desired operating frequency by following the calibration instructions in TM 11–856, Radio Receiver R–390/-URR.

(*b*) On the receiver, set the BFO switch to the ON position and set the BFO PITCH control to 0.

(*c*) Adjust the transmitter TUNING CONTROL until the signal heard in the receiver is zero beat. The transmitter frequency is now the same as that indicated on the KILOCYCLES CHANGE dial regardless of any small difference from transmitter dial reading.

(11) Throw the PLATE POWER circuit breaker to ON.

(12) Throw the PLATE RELAY switch to on (up).

(*a*) Red PLATE POWER indicator lamp lights.

(*b*) P A PLATE meter shows a reading.

(13) Adjust the POWER AMPLIFIER TUNING control to resonance (tuning to the desired frequency) as indicated by the minimum reading on the P A PLATE meter.

(14) Adjust the POWER AMPLIFIER LOADING control to obtain a reading of 150 milliamperes (ma) on the P A PLATE meter.

(15) Readjust the POWER AMPLIFIER TUNING control for a minimum reading on the P A PLATE meter.

(16) Readjust the POWER AMPLIFIER LOADING control for the 150-ma reading on the P A PLATE meter.

Note. For the procedures in (13) through (16) above, the numbers of the tuning controls may be changed so that they do not fall in the approximate center of the shaded areas of the calibration charts. This is permissible as long as they remain inside the shaded areas.

(17) Throw the TUNE-OPERATE switch to OPERATE (TUNE-NORMAL switch to NORMAL in A and C models).

(*a*) P A PLATE meter should read approximately 350 ma. If not, repeat the procedures in (15) and (16) above until 350 ma is obtained.

(*b*) EXCITATION meter should indicate a reading of 8 to 12 ma at P A GRID X2 position.

(*c*) Turn the EXCITATION METER SWITCH to INT AMP PLATE X10 position and EXCITATION meter reading should be between 20 and 70 ma.

Caution: Be sure 70 ma is not exceeded, because the life of the intermediate power amplifier (ipa) tube will be reduced considerably.

(*d*) FIL VOLTAGE meter should read 5 to 5.2 volts. If not, repeat the procedure in (7) above.

b. AM Tuning Procedure.

(1) Follow the tuning procedure for cw (*a* above) with the following exceptions:

(*a*) For the procedure in *a*(5) above, turn the SERVICE SELECTOR switch to AM.

(*b*) For the procedure in *a*(14) above, adjust the POWER AMPLIFIER LOADING control for a 125-ma reading on the P A PLATE meter.

(*c*) For the procedures in *a*(17) (*a*) through (*d*) above, the P A PLATE meter should read a maximum of 275 ma.

(2) Turn the EXCITATION METER SWITCH to the MOD PLATE X20 position.

(3) Adjust the MODULATOR BIAS control until a reading of 50 ma is obtained on the EXCITATION meter.

(4) Now talk normally into the microphone and check for a maximum reading of 230 ma on the EXCITATION meter. If 230 ma is not exceeded on peaks, the transmitter is adjusted for 100 percent modulation with peak clipping control for modulation over 100 percent.

c. EXT EXC Tuning.

(1) Follow the cw tuning procedure in *a*(1) through (8) above but turn the SERVICE SELECTOR switch to EXT EXC (*a*(5) above).

(2) Set the tuning control on the external exciter source for the desired frequency. The transmitter accepts signals in the frequency range of 1.5 to 20.0 mc in the EXT EXC position.

(3) Turn on the external exciter unit.

(4) Calibrate the external exciter unit.

(5) Set the KEYING switch to the CONTINUOUS position (EXCITER PLATE POWER switch up in basic model).

(6) Adjust the TUNING CONTROL for a maximum reading on the EXCITATION meter (8 ma minimum).

(7) Follow the cw tuning procedure in *a*(11) through (17) above.

(8) The transmitter is now tuned for EXT EXC operation.

d. FSK Tuning. The tuning procedure is identical with the EXT EXC tuning procedure except that the SERVICE SELECTOR switch must be turned to FSK. For FSK tuning, the following conditions must be observed:

(1) Be sure that the FSK exciter is turned on before throwing the KEYING switch to the CONTINUOUS position (EXCITER PLATE POWER switch up in basic model).

(2) The transmitter accepts signals in the 1.5- to 6.0-mc range only.

(3) During operation of the radioteletype system, the frequency of the transmitted mark signal is lowered 850 cycles to produce a spacing signal (as in Frequency Shift Exciter O–39/-TRA). The frequency of the transmitted mark signal may range from 1.5 to 20 mc. Since the frequency range of the exciter is limited to a lower range, transmission at higher frequencies involves frequency multiplication in the transmitter. To limit the frequency shift to 850 cycles, it is necessary to reduce the amount of frequency shift supplied by the exciter. The frequency shift and multiplication factor involved for different ranges of transmitter frequency are shown in the table below.

Exciter frequency (mc)	Transmitter frequency (mc)	BAND SELECTOR switch position	Transmitter multipliers used	Transmitter multiplication	Exciter frequency shift (cps)
1.5–3.0	1.5– 3.0	1.5– 3.0	None	X1	850
	3.0– 6.0	3.0– 6.0	1	X2	425
	6.0–12.0	6.0–12.0	2	X4	212.5
3.0–6.0	3.0– 6.0	3.0– 6.0	None	X1	850
	6.0–12.0	6.0–12.0	1	X2	425
	12.0–20.0	12.0–20.0	2	X4	212.5

e. FSK-AM Tuning.

(1) Tune the transmitter in the FSK position (*d* above).

(2) Turn the SERVICE SELECTOR switch to the FSK-AM position.

f. Tuning Procedure of Antenna Tuning Unit BC–939–B (fig. 7).

Warning: Extremely high rf voltages are present on the antenna tuning unit when the transmitter is in operation. Painful burns will result upon contact.

(1) *Whip antenna.*

(*a*) Follow the cw tuning procedure in *a*(1) through (8) above.

(*b*) Turn the COUPLING control to the setting that corresponds to the desired frequency (par. 15*b*).

(*c*) Turn the FREQUENCY control to the setting (par. 15*b*) corresponding to the desired frequency.

(*d*) Set the range switch to the position corresponding to the desired frequency.

(*e*) Follow the cw tuning procedure in *a*(9) through (17) above, but use the FREQUENCY control of the tuning unit instead of the POWER AMPLIFIER LOADING control.

(*f*) A maximum reading on the ANTENNA CURRENT meter indicates the correct tuning procedure.

(*g*) If the minimum P A PLATE meter reading is above or below 350 ma, alternately decrease or increase the COUPLING control to obtain this reading. Repeat the procedures in *a*(17)(*a*) above until maximum rf current occurs on the ANTENNA CURRENT meter.

(2) *Long-wire antenna.* The tuning procedure for the long-wire antenna is identical with the whip antenna tuning procedure except for the following differences:

(*a*) Set the COUPLING control at about 2.0.

(*b*) Set the range switch at LONG WIRE.

(*c*) Turn the FREQUENCY control that covers the low-frequency range to about the center of its range. The exact settings of the COUPLING and FREQUENCY controls will be found in the tuning procedure as indicated by a maximum reading on the ANTENNA CURRENT meter.

Note. If the tuning or loading numbers of the POWER AMPLIFIER TUNING and POWER AMPLIFIER LOADING indicators of the transmitter are not the same as those within the shaded area of the chart being used, it is an indication that the whip or long-wire antenna does not furnish a proper load to the transmitter. Check the antenna for proper length at the operating frequency being used.

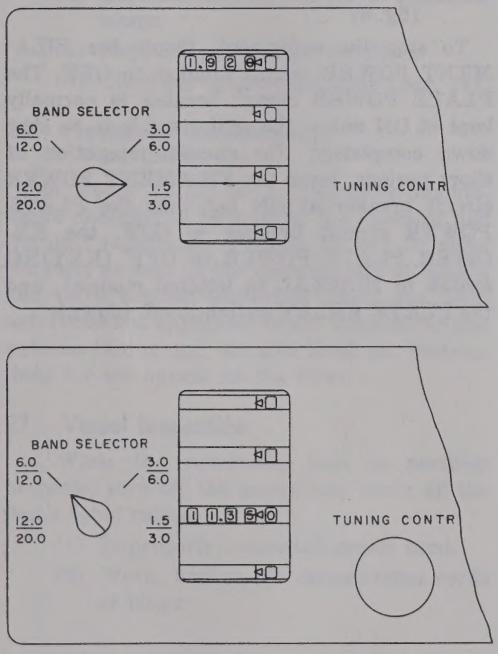

Figure 18. TUNING CONTROL dial, 1.5–3.0 mc and 6.0–12.0 mc band positions.

18. Starting Procedure
(fig. 6)

If the transmitter is being energized initially or if the frequency of operation is being changed, follow the procedures outlined in paragraphs 16 and 17. If the transmitter is to be operated at the frequency last used before the equipment was shut down, perform the following:

a. Set the FILAMENT POWER circuit breaker to OFF.

b. Set the PLATE POWER circuit breaker to ON.

c. Set the KEYING switch to NORMAL (EXCITER PLATE POWER switch OFF in basic model).

d. Set the PLATE RELAY switch to on (up).

e. Set the FILAMENT POWER circuit breaker to ON.

(1) Green FILAMENT POWER indicator lights.
(2) Blowers go on.
(3) Red PLATE POWER indicator lights approximately 25 seconds later.

Note. In all types of operation the FILAMENT POWER and PLATE POWER circuit breakers are left at ON while the KEYING (EXCITER PLATE POWER switch in basic model) and PLATE RELAY switches will be on or off, depending on the type of operation desired.

19. Cw Operation
(fig. 6)

Follow the starting procedure (par. 18) before performing cw operation.

a. Check to see that the SERVICE SELECTOR switch is at cw.

b. Throw the KEYING switch to NORMAL (EXCITER PLATE POWER switch to OFF in basic model).

c. Throw the PLATE RELAY switch to on (up).

d. Close the handkey.

20. AM Operation
(fig. 6)

Follow the starting procedure (par. 18) before performing AM operation.

a. Check to see that the SERVICE SELECTOR switch is at AM.

b. Throw the KEYING switch to NORMAL (EXCITER PLATE POWER to OFF in basic model).

c. Throw the PLATE RELAY switch to off (down).

d. Press the microphone switch.

21. EXT EXC Operation
(fig. 6)

Follow the starting procedure (par. 18) before performing EXT EXC operation.

a. Check to see that the SERVICE SELECTOR switch is at EXT EXC.

b. Turn on the external exciter unit.

c. Turn the KEYING switch to the CONTINUOUS position (EXCITER PLATE POWER switch to on (up) in basic model).

d. Turn the PLATE RELAY switch to on (up).

22. FSK Operation
(fig. 6)

Follow the starting procedure (par. 18) before performing FSK operation.

a. Check to see that the SERVICE SELECTOR switch is at FSK.

b. Turn on the frequency-shift exciter unit.

c. Set the KEYING switch to the CONTINUOUS position (EXCITER PLATE POWER switch to on (up)) and check for a reading on the EXCITATION meter at P A GRID X2 position.

d. Turn PLATE RELAY switch to on (up).

e. Key the frequency-shift exciter unit.

23. FSK-AM Operation
(fig. 6)

Follow the starting procedure (par. 18) before performing FSK-AM operation.

a. Check to see that the SERVICE SELECTOR switch is at FSK-AM.

b. Turn on the external exciter unit.

c. Set the KEYING switch to CONTINUOUS (EXCITER PLATE POWER switch to on (up) in basic model) and check for a power amplifier grid current reading.

d. Turn the PLATE RELAY switch to on (up).

e. Key the frequency-shift exciter and talk into the microphone.

24. Stopping Procedure
(fig. 6)

To stop the equipment, throw the FILAMENT POWER circuit breaker to OFF. The PLATE POWER circuit breaker is normally kept at ON unless the equipment is to be shut down completely. For standby operation of short periods, leave the FILAMENT POWER circuit breaker at ON but turn the PLATE POWER circuit breaker to OFF, the EXCITER PLATE POWER to OFF (KEYING switch to NORMAL in lettered models), and the PLATE RELAY switch to off (down).

CHAPTER 3
MAINTENANCE INSTRUCTIONS

25. Scope of Operator's Maintenance

a. Following is a list of maintenance duties normally performed by the operator of Radio Transmitter T–368(*)/URT. These procedures do not require special tools or test equipment.

b. Operator's maintenance consists of the following:

(1) Preventive maintenance (par. 26).
(2) Visual inspection (par. 27).
(3) Operational checklist (par. 28).
(4) Replacement of defective indicator lamps.
(5) Replacement of defective fuses.
(6) Checking cable connections (par. 14).

26. Preventive Maintenance
(figs. 19 and 20)

DA Form 11–238 is a preventive maintenance checklist to be used by the operator and the unit repairman. Figures 19 and 20 show the form as used by the operator and all second and third echelon inspection items are lined out. Items not applicable to the transmitter and antenna tuning unit are also lined out. Instructions for use appear on the form.

27. Visual Inspection

a. When the equipment fails to perform properly, turn off the power and check all the items listed below.

(1) Improperly connected power cord.
(2) Worn, broken, or disconnected cords or plugs.
(3) Blown fuses or tripped circuit breaker.
(4) Switches (or other controls) set incorrectly.
(5) Knobs of band switches, tuning controls or antenna tuning unit controls loose on shaft.
(6) Jumper plug loose or out of receptacle at rear of transmitter (fig. 4).

b. If the above checks do not locate the trouble, proceed to the operational checklist (par. 28).

28. Operational Checklist

a. General. The operational checklist consists only of preliminary starting and operating procedures. The corrective measures listed encompass those the operator can perform. If the measures suggested do not restore normal equipment performance or if the tuning procedures of paragraph 17 do not correct the trouble, troubleshooting by a Field Radio Mechanic is required. Note on the repair tag what corrective measures were taken and how the equipment performed at the time of failure.

b. Procedure. If the transmitter is being energized initially or if the frequency of operation is changed, follow the procedures outlined in paragraphs 16 and 17. If the transmitter is to be operated at the frequency last used before the equipment was shut down, perform the procedures of paragraph 18*a* through *d*. Perform the operations in *c* below in the order given, then follow the tuning procedures (par. 17) for the desired mode of operation.

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
26. ~~INSPECT ANTENNA FOR ECCENTRICITIES, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS.~~	
27. ~~CHECK FOR NORMAL OPERATION.~~	
28. ~~BEFORE SHIPPING OR STORING, REMOVE BATTERIES.~~	

IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.

ITEM 7- CORD CD-763 (POWER CABLE) FRAYED. REPORTED TO 2D ECHELON MAINTENANCE FOR REPAIR.

MAINTENANCE CHECK LIST FOR SIGNAL EQUIPMENT
SOUND EQUIPMENT, RADIO, DIRECTION FINDING RADAR, CARRIER, RADIOSONDE AND TELEVISION
(AR 750-625)

EQUIPMENT NOMENCLATURE: RADIO TRANSMITTER T-368 C/URT

EQUIPMENT SERIAL NUMBER: 427

INSTRUCTIONS

This form may be used for a period of one month by using the correct dates and weeks of the month. It is to be used as a Preventive Maintenance check list for Signal equipment in actual use, or for a check on equipment prior to issue.

1. For detailed Preventive Maintenance instructions see:
   a. The Technical Manual *(in TM 11 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
   b. The Supply Bulletin *(SB 11-100 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
   c. The Department of the Army Lubrication Order. *(See DA Pamphlet Number 310-4)*

2. The following action will be taken by either the Communications Officer/ Chief for 1st echelon, or the Inspector for higher echelon:
   a. Enter Equipment Nomenclature and Serial Number.
   b. Strike out items that do not apply to the equipment.

3. Operator/Inspector will enter in the columns entitled CONDITION, on the proper line, a notation regarding the condition, using symbols specified under LEGEND.

4. After operator completes each daily inspection he will initial over the appropriate dates under "Daily Condition for Month", then return form to his supervisor.

FOLD

TYPE OF INSPECTION

OPERATOR	2/3 ECHELON	DATE	SIGNATURE
✓		10 FEB	CPL Roy G Barrie

DA FORM 1 MAY 57 11-238

REPLACES DA FORMS 11-238, 1 NOV 55; 11-239, 11-244, 11-245, 11-248, 11-249, 11-250, AND 11-251; WHICH ARE OBSOLETE.

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Figure 19. DA Form 11–238, pages 1 and 4.

LEGEND for marking conditions:
Satisfactory, ✓.
Adjustment, Repair or Replacement required, X.
Defect corrected, (X).

DAILY CONDITION FOR MONTH OF

NO.	DAILY ITEM	1 RB 17	2 RB 18	3 RB 19	4 RB 20	5 RB 21	6 RB 22	7 RB 23	8 RB 24	9 RB 25	10 RB 26	11 27	12 28	13 29	14 30	15 31	16	2D 3D ECHELON
1.	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT. *(Transmitter, ~~receiver, carrying cases, wire~~, cables, microphones, ~~tubes~~, spare parts, technical manuals).*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
2.	CLEAN DIRT AND MOISTURE FROM ~~ANTENNA~~, MICROPHONES, ~~HEADSETS~~, KEYS, JACKS, PLUGS, COMPONENT PANELS.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
3.	INSPECT CONTROLS FOR NORMAL OPERATION. ~~TAP CONTROLS LIGHTLY FOR EVIDENCE OF CUT-OUT FROM LOOSE CONTACTS.~~	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
4.	CHECK FOR NORMAL OPERATION OF EQUIPMENT. BE ALERT FOR UNUSUAL OPERATION OR CONDITION.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							

WEEKLY	CONDITION EACH WEEK 1ST	2D	3D	4TH	5TH	2D 3D ECH
5. CLEAN ~~AND TIGHTEN~~ EXTERIORS OF CASES, ~~RACKS~~, MOUNTS, ~~TRANSMISSION LINES~~.	✓					
6. INSPECT ~~CASES~~, MOUNTS, ~~ANTENNA TOWERS~~ AND EXPOSED METAL SURFACES FOR RUST, CORROSION.	✓					
7. INSPECT CORDS, CABLE, ~~WIRE~~, SHOCK MOUNTS FOR CUTS, KINKS, BREAKS, FRAYING, UNDUE STRAIN.	X					
8. ~~CHECK ANTENNA GUY WIRES FOR PROPER TENSION OR DAMAGE.~~						
9. ~~INSPECT CANVAS AND LEATHER ITEMS FOR MILDEW, TEARS, FRAYING.~~						
10. INSPECT ACCESSIBLE ITEMS FOR LOOSENESS: SWITCHES, KNOBS, JACKS, CONNECTORS, ~~RELAYS, TRANSFORMERS, MOTORS~~, PILOT LIGHTS, ~~BLOWERS~~, ETC.	✓					
11. CLEAN AND/OR INSPECT AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS.	✓					
12. ~~INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, SPECIFIC GRAVITY, DAMAGED CASES. INSPECT DRY BATTERIES FOR LEAKAGE.~~						

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
13. ~~INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHER-PROOFING, TEARS, FRAYING.~~	
14. ~~CHECK TERMINAL BOX COVERS FOR CRACKS, DIRT, LEAKS, DAMAGED GASKETS, BREAKS.~~	

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
15. ~~INSPECT SEATING OF READILY ACCESSIBLE PLUG-IN ITEMS, TUBES, LAMPS, FUSES, CRYSTALS, CONNECTORS, VIBRATORS, PLUG-IN COILS.~~	
16. ~~INSPECT RELAYS AND CIRCUIT BREAKERS FOR LOOSE MOUNTINGS, BAD CONTACTS, MIS-ALINEMENT OF COIL TASTS AND SPRINGS, PROPER SPRING TENSION.~~	
17. ~~INSPECT VARIABLE CAPACITORS FOR DIRT, MIS-ALINEMENT OF PLATES, LOOSE MOUNTINGS, MOISTURE.~~	
18. ~~INSPECT RESISTORS, BUSHINGS AND INSULATORS FOR CRACKS, CHIPPING, BLISTERING, MOISTURE, DISCOLORATION.~~	
19. ~~CLEAN AND TIGHTEN SWITCHES, TERMINAL BLOCKS, BLOWERS, RELAY CASES AND INTERIORS OF CHASSIS AND CABINETS NOT READILY ACCESSIBLE.~~	
20. ~~INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS.~~	
21. ~~INSPECT TERMINALS OF LARGE FIXED CAPACITORS AND RESISTORS FOR DIRT, CORROSION, LOOSE CONTACTS.~~	
22. ~~INSPECT TRANSFORMERS, CHOKES, POTENTIOMETERS AND RHEOSTATS FOR OVERHEATING AND OIL LEAKAGE.~~	
23. ~~INSPECT GENERATORS, AMPLIDYNES, DYNA MOTORS FOR BRUSH WEAR, SPRING TENSION, ARCING AND PITTING OF COMMUTATOR.~~	
24. ~~INSPECT CATHODE RAY TUBES FOR BURNT SCREEN SPOTS.~~	
25. ~~INSPECT WATERPROOF GASKETS FOR LEAKS, WORN OR LOOSE PARTS.~~	

CONTINUED ON PAGE 4

2 3

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Figure 20. DA Form 11-238, pages 2 and 3.

c. Operational Checklist.

	Action	Normal indication	Corrective measure
PRELIMINARY STARTING AND OPERATING PROCEDURE	1. Set FILAMENT POWER circuit breaker to ON.	Green light lights	Check FILAMENT POWER lamp.
		Blowers go on	Press THERMAL RESET button. Refer to paragraph 27.
		FIL VOLTAGE meter indicates 5 to 5.2 volts.	Adjust FILAMENT VOLTAGE control.
		Red PLATE POWER lamp lights in approximately 25 seconds. P A PLATE meter shows low reading.	Check OVERLOAD RESET. Check PLATE POWER lamp. Refer to paragraph 27. Higher echelon repair required.
	2. Set EXCITATION METER switch to MOD PLATE X20 position.	Approximately 50-ma reading on EXCITATION meter.	Adjust MODULATOR BIAS control. Higher echelon repair required.
	3. Set PLATE POWER circuit breaker and PLATE RELAY switch to off (down) positions.	Red light goes off and P A PLATE meter reading drops to zero.	
	4. Set EXCITATION METER switch to P A GRID X2 position and set KEYING switch to CONTINUOUS position (EXCITER PLATE POWER switch on (up) in basic model).	8-ma minimum reading on EXCITATION meter.	Higher echelon repair required.
	5. Set EXCITATION METER switch to INT AMP PLATE X10 position.	20- to 70-ma reading on EXCITATION meter.	Higher echelon repair required.

CHAPTER 4
SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

29. Disassembly

When the transmitter is part of a set, refer to the appropriate manual for specific disassembly instructions. General instructions are given below.

a. Disconnect and remove any antenna tuning unit that may be on top of the transmitter.

b. Disconnect all cabling to the equipment.

c. If the base is bolted to the floor, remove the bolts.

30. Repackaging for Shipment or Limited Storage

Repackaging of the transmitter and tuning unit is performed at higher echelons.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

31. Authority for Demolition

Demolition of the equipment will be accomplished only upon order of the commander. The destruction procedures outlined in paragraph 32 will be used to prevent further use of the equipment.

32. Methods of Destruction

a. Smash. Smash the controls, indicators and meters, tubes, coils, capacitors, switches, transformers, gears, and sealed assemblies; use sledges, axes, handaxes, pickaxes, hammers, crowbars, or heavy tools.

b. Cut. Cut cords and wiring; use axes, handaxes, or machetes.

c. Burn. Burn cords, wiring, and technical manuals; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. Bend. Bend panels, housing, and chassis.

e. Explode. If explosives are necessary, use firearms, grenades, or TNT.

f. Dispose. Bury or scatter the destroyed parts in slit trenches, foxholes, or other holes, or throw them into streams.

APPENDIX

REFERENCES

Following is a list of references applicable and available to the operator of Radio Transmitter T–368(*)/URT and Antenna Tuning Unit BC–939–B:

TM 11–264B	Radio Set AN/GRC–26D.
TM 11–621	Radio Set AN/GRC–41.
TM 11–640A	Radio Set AN/GLQ–2.

[AG 413.44 (25 Feb 58)]

BY ORDER OF THE SECRETARIES OF THE ARMY AND THE AIR FORCE:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

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Major General, United States Army,
The Adjutant General.

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Port of Emb (OS)
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OS Sup Agcy
USA Sig Pub Agcy
USA Sig Comm Engr Agcy
USA Comm Agcy
TASSA
TASSA, Chicago Rgn Ofc
USA Sig Eqp Spt Agcy
USA White Sands Sig Agcy
Yuma Test Sta
USA Elct PG
Sig Fld Maint Shops
Sig Lab
Mil Dist
JBUSMC
Units org under fol TOE:
5–348
5–500 (AA–AD)

5–501
6–315
6–317
6–545
6–558
6–635
11–7
11–15
11–16
11–17
11–18
11–57
11–95
11–98
11–99
11–117
11–127
11–128
11–500 (AA–AE)
11–537
11–557
11–587
11–592
11–597
17–51
17–55
20–45
20–46
20–47
20–300
32–51
32–55
32–56
32–500
39–51
39–61
44–7
44–12
44–101
55–201

NG: State AG; units—same as Active Army.

USAR: None.

For explanation of abbreviations used, see AR 320–50.

320–50.

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